OCTOBER 1961

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THE Airman

OFFICIAL JOURNAL OF THE AIR FORCE

The B-58 *Hustler*—page 7.

"Aerospace forces
exert a dynamic imp
in all forms of
international relation

AFM 1-

TAC over the Andes.
Page 20.

Unique characteristics of U.S. airpower employed to promote peaceful objectives of national policy.

APCS Photo

THE Airman

OFFICIAL JOURNAL OF THE AIR FORCE

Volume V, Number 10 October 1961

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USAF RECURRING PUBLICATION 30-15

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SUBSCRIPTIONS

THE AIRMAN is available on subscription for $3.50 per year domestic, $4.75 foreign, 35¢ per copy, through the Superintendent of Documents, Government Printing Office, Washington 25, D. C. No back copies can be furnished.

Editorial Office: THE AIRMAN, Room 2-206 Tempo E, 4th and Adams Drive, S.W., Washington 25, D. C. Telephone: OXford 6-7393.

THE AIRMAN is primarily a medium for the exchange of ideas and information among Air Force personnel. Readers are encouraged to submit articles, short subjects, photographs, and artwork. All contributions will be given consideration; suggestions and criticisms are welcomed. Opinions expressed by individual contributors do not necessarily reflect the official viewpoint of the Department of the Air Force. All photographs are official USAF photos unless otherwise designated.

LETTERS TO THE EDITOR

Thimk

Sir: Mull it over and I think you'll agree that the Armed Services Subcommittee on Defense Department Appropriations could not have begun hearings on February 29 of this year as stated in *We Will Hear Your Statement,* page 7 of your July issue.

John Perry
Washington, D. C.

● *It would be a little difficult, wouldn't it? Even for the gremlins who tampered with the copy.*

★ ★ ★

The Handicapped

Sir: We would like to congratulate THE AIRMAN staff on the article *Can Handicapped Children Be Helped?* which appeared in the July issue. It was the most heartwarming material we have read in many a moon. The education of handicapped children is definitely more of a struggle for those in service, but we have found the Air Force is always more than willing to help. We would like to include some information for parents of handicapped children who are scheduled for transfer to England. There are very good facilities here for the education of these youngsters. These are provided by the British school system, without regard to race, creed, or color. The cost is very reasonable. We hope you will provide more articles of this type—possibly, for example, listing the educational facilities in each state and the different overseas areas. Again, thank you for your efforts.

TSgt. and Mrs. G. F. Goldner
APO 125, New York, N. Y.

● *An excellent suggestion, and as additional information becomes available to us, we will publish it.*

Sir: I wish to express my thanks for the fine article on handicapped children which appeared in your July issue. In it, Mr. Karten mentioned the New Jersey Department of Institutions and Agencies and the fact they furnish instructions in how to take care of these children at home. Is it possible for you to furnish me their complete address? Please publish more articles of this nature in future issues.

SSgt. Rafael Ramirez-Gonzalez
Glasgow AFB, Mont.

● *This information is available from Commissioner John W. Tramburg, State Department of Institutions and Agencies, Trenton, N. J.*

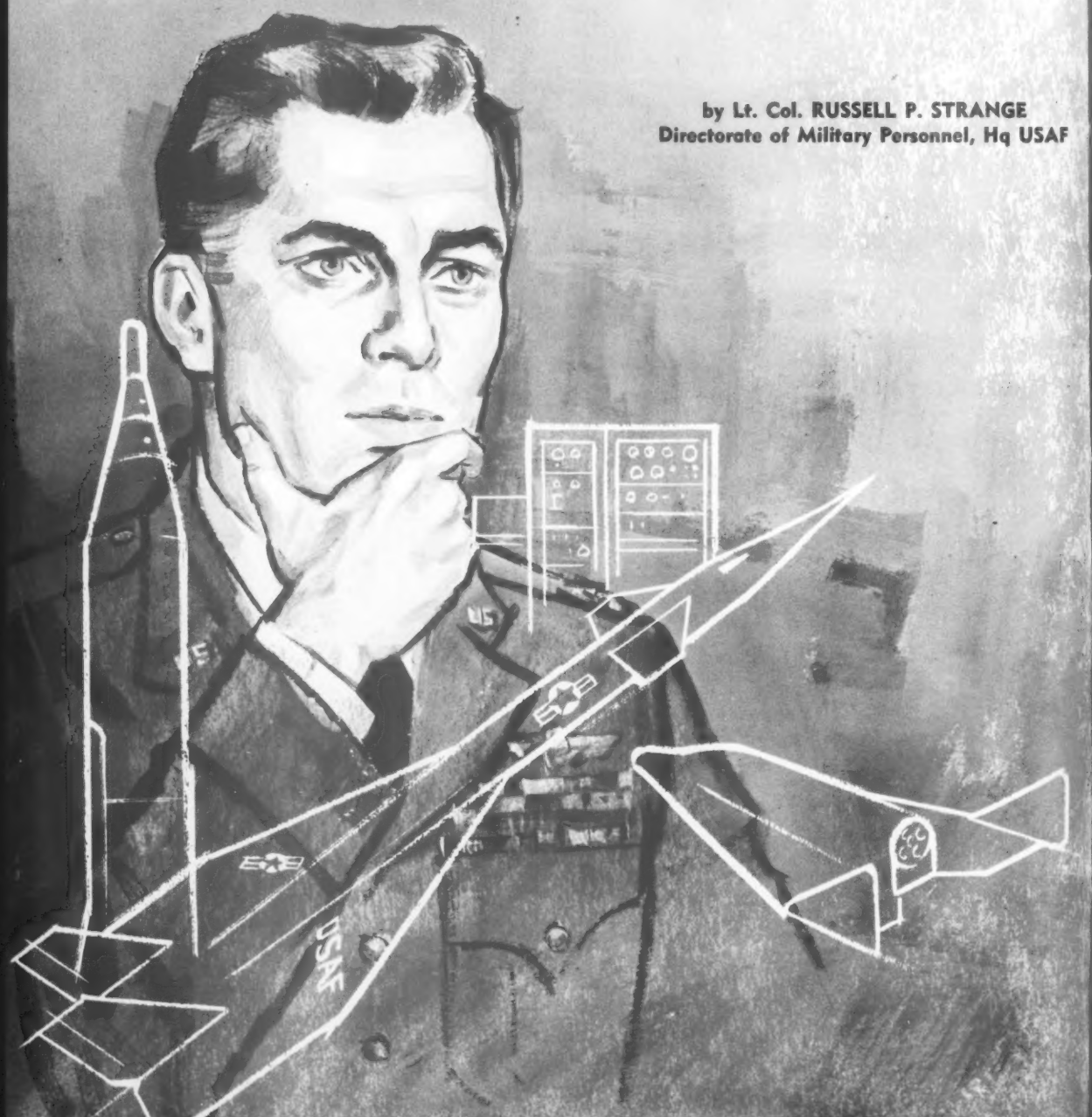
★ ★ ★

(Continued on page 33)

AS THE AIR FORCE DEPENDS MORE AND MORE ON THE PRODUCTS OF SCIENCE AND TECHNOLOGY SO MUST GREATER ATTENTION BE DEVOTED TO . . .

The Challenge of In

by Lt. Col. **RUSSELL P. STRANGE**
Directorate of Military Personnel, Hq USAF



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...NTAIN OPTIMUM EFFECTIVENESS,

...llectual Resources

THERE WAS A TIME, in the not-too-distant past, when the term "military manpower" evoked an image of large numbers of young men in good physical condition neatly positioned with their equipment in well-ordered ranks. Discipline, courage, fortitude, and endurance were the individual qualities traditionally associated with the requirements of the military profession.

Now, however, personal characteristics essential to the effective functioning of the military group have become altered because of the revolutionary upheaval in technology which we have witnessed in less than a 20-year span. The traditional qualities are still valued, but are insufficient. Top-level leadership is more and more concerned with the total intellectual capacity of the military establishment—particularly with the technical level of education of the young officers who must move up in responsibility to meet the future.

History will record the years following World War II as the eruption of the scientific revolution, the outbreak of the technological war between the great powers. There took place a volcanic displacement of an old order by a new. Its effects will color human experience of the future more than any previous event since the beginning of civilization. This is the salient fact of our time.

Nothing we can do will alter the fact that we are faced with continued and increasing reliance on science and technology for economic well-being and national security. Our survival as a free people will depend on how wisely we manage our scientific and technological resources. Most important, as always, are the individuals, especially young men who are—or who can be—educated to meet the challenge they cannot avoid. They are tomorrow's history makers.

The revolution I speak of is by no means restricted to areas of military interest. But the magnitude of its impact is vividly evident in the growing complexity of weapon systems and the degree of sophistication in concepts for their employment.

As the new emphasis on science and technology sweeps like a forest fire across the entire structure of our society, it is hardly surprising that the United States finds itself faced with an acute shortage of scientists, engineers, and technicians from the outset. And, unfortunately, this is a general condition which must inevitably become worse before any permanent and significant correction can be effected. No less an authority than Dr. Edward Teller, Livermore Radiation Laboratory, University of California, expresses a grave estimate of the problem.

"Today, there is a question where leadership lies. But there is no question which country is developing scientists more effectively. This country is Russia. I think there cannot be a shadow of a doubt that 10 years from now Russia will be the unquestioned leader in the scientific field. This is something which I believe we cannot change no matter what we do today . . . And even if we bend all our efforts to change the present situation, all we can hope for is to regain lost leadership later."

Many Americans find it difficult to understand and accept such a blunt statement, despite the acknowledged stature of the author. They point with pride to new scientific accomplishments and fresh dramatic exploits appearing almost daily, while recalling the vigorous response of the United States to emergencies in the past. However, today is vastly more complex than yesterday. Vigorous response to complexity and technological challenge needs lead-time and brilliance of intellect. There are factors associated with our present position which have no parallel in history.

In another arrangement of circumstances man might have explored all the exciting new areas opened by science in deliberate, methodical fashion—as a natural extension of the development of industrial civilization. One of the tragedies befalling mankind is that the Soviet Union has chosen to exploit scientific and engineering achievements as an instrument of subjugation and domination. The scientific revolution which might have been for progress has been debased by the imposition of an arms race. The exhilarating experience associated with the exploration of space has become a frantic scramble to insure survival.

The development in the United States of its unmatched industrial society has been based on preeminence in the fields of applied research and tech-

nology—the application of scientific knowledge. Contributions to the quest for fundamental new knowledge and basic scientific principles has been modest in contrast. From European intellects came the formulation of the laws governing the transformation of energy, the physical and chemical structure of matter, and the behavior of electricity, light, and magnetism.

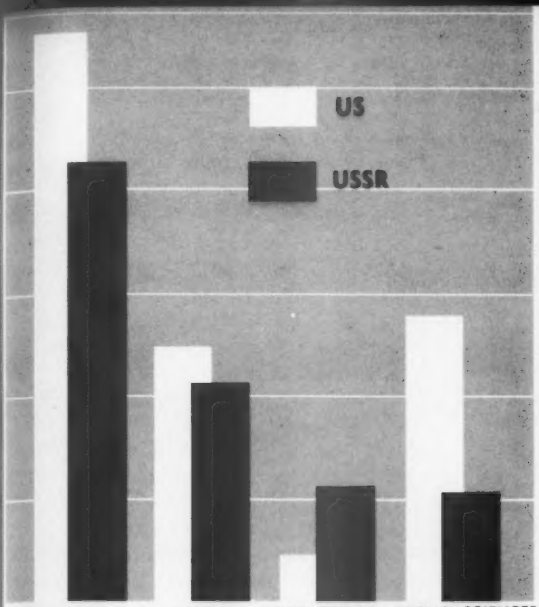
With the 20th century, science has emerged from its subordinate position in the United States and our society has been transformed as a result. The rapid pace began when the first self-sustaining atomic chain reaction in history was announced on December 2, 1942, at Chicago. As the scientific and technological advance accelerated, the scarcity of educated and capable manpower loomed ever more ominously as a major problem area for the nation. And now tomorrow is already here and we are in space.

In spite of the dramatic move by many of our colleges and universities to the forefront of the scientific scene, it became evident early in this new era that the educational structure generally could not support the magnitude of effort involved. And as the pressures of the Cold War intensified from 1948 forward, the situation became aggravated. New generations of capable scientists, engineers, and technicians simply could not be produced in sufficient number.

The war itself, despite what it produced in the way of discovery, had a deleterious effect on the scientific manpower situation which bedevils us up to the present. During the years of conflict, the United States incurred a deficit of 150,000 science and technology students who—were it not for the war—would have earned bachelor's degrees. Carried forward into succeeding years this deficit is naturally followed by a deficit in the number of those reaching the master's and doctorate level of education. This shortage is estimated at 17,000 for 1955 in the fields of chemistry, engineering, geology, mathematics, physics, psychology, and the biological sciences. These are the people—the absentees—who should now be reaching peak effectiveness in the highest ranks of the scientific community.

With respect to the educational system in general, serious questions have been raised about the quality of American education and its capacity to meet increasing demands for thoroughly trained manpower. Traditionally in this country, the caliber of elementary and secondary schools has been determined by the attitudes and wishes of local communities. So long as students disdain difficult studies in foreign languages, science, and mathematics; so long as citizens were reluctant to vote increased taxes to provide better schools; then so long did the quality of the educational system jog along over an improvised, casual course.

In a report to the President of the United States the Science Advisory Committee had this to say on the subject. "In a frontier society, such as that of America of 100 years ago, it was natural that physical prowess and bravery, inherent in the pioneer, should have been held in high esteem. Today the frontier is intellectual—



ESTIMATED NUMBER OF ADVANCED DEGREE HOLDERS, 1959, US & USSR.

the scholar, the research worker, the scientist, the engineer, the teacher are the pioneers.

"Though the star athlete may remain a hero, it is now evident that an even deeper recognition be given to the scholar."

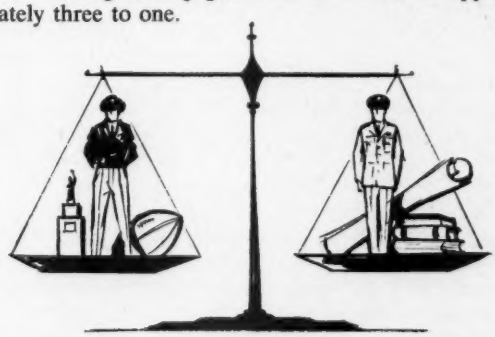
An obvious question then arises: What can be done about this perilously dangerous situation? Can the deficiencies of the American school system be corrected in time?

As a military man, I would not presume to prescribe remedies for the shortcomings of American education. Palliatives offered gratuitously by outsiders—however interested—can perhaps impede the work of qualified professional groups, in and out of government, who are grappling with the task. We can accept the judgment of these authorities that the problem is highly complex, perhaps even more involved than the development of an ICBM weapon system. There are the obvious areas of teachers' salaries and physical facilities. In addition there are numerous abstract factors such as a re-evaluation of curricula on a national basis, course-content improvement, identification of aptitudes and others. There is no quick "fix" or cure-all that can be applied to the educational system. Neither, on the other hand, is there any question about the existence of highest quality raw intellect in our population. It is encouraging to remember that of the 67 Nobel prizes awarded for physics, chemistry, medicine, and physiology from 1943 to 1956, 34 were won by United States scientists.

During the hearing on fiscal year 1961 appropriations before the Subcommittee on Independent Offices, House of Representatives, information was presented comparing the position of the United States in science and engineering with that of the Soviet Union. A total of 46 million students are enrolled at all levels of formal education in the U. S., and 36 million in the U.S.S.R. At the higher educational level there are 3.5 million enrolled in the U. S. and only 2.2 million in the U.S.S.R.

Significantly, however, higher education in the Soviet Union emphasizes engineering, science, and medicine; most diplomas are granted in these fields. Less than a quarter of baccalaureates awarded in the U. S. are earned in these areas. Nearly one-third of Soviet baccalaureates are in engineering, compared with one tenth in the U. S. Half of the people in the U. S. who hold doctorate degrees earned them in the natural sciences and engineering. In the U. S. S. R. more than three-quarters of the doctorates are in science and engineering.

Currently the U. S. S. R. is out-producing the United States in engineering graduates at a rate of approximately three to one.



Bringing this broad general view into perspective for us in the Air Force, I see two distinct messages. Certainly we must continue to do everything possible to attract young men with the proper academic qualifications and intellectual capacity into uniform. Since the national requirement for people of this caliber—in government, industry, the military services, and the universities—is literally open-ended, it is only realistic to acknowledge that the available numbers of the specific types required may be insufficient for some time to come.

There is a second important course of action open which could well help the Air Force bridge the gap mentioned earlier in the quotation from Dr. Teller. This entails exploiting more fully the intellectual resources now on board, particularly among younger officers, by encouraging them to adapt to the changing requirements of the Air Force.

uring the years ahead it is inevitable that the Air rce will live in even closer association with the ientific community. It will be necessary for the r Force to keep the scientific world apprised of its jectives and policies by continuous communication.

The conclusion is inescapable that we must respond promptly to the downward trend in rated officer requirements by accelerating the change-over of enterprising and qualified officers from the rated area into the scientific and engineering fields. Experience proves

that new second lieutenant engineers, however brilliant, cannot assume responsibilities beyond their years; seasoning and judgment generated by experience are essential. The management know-how and relative maturity of officers now on board is irreplaceable. These are the attributes that cannot be quickly procured by whatever brand of wizardry.

The range of opportunities is so broad that any capable officer will find a place for himself. Requirements do not demand that every individual associated with scientific and engineering areas become a nuclear physicist or a potential Nobel prize winner. Opportunities range all the way from doctors of the astrosciences, through automatic data programmers and civil engineers, to administrators with a smattering of the world of science and a working knowledge of its vocabulary.

Dr. James Killian commented on this point a short time ago. His thought was oriented to national requirements, but there is no doubt that it is applicable to the Air Force. "It's going to take great wisdom and management," he said, "to see that scientific development is applied wisely to the quality as well as the quantity of human life. . . . We will . . . need a new brand of administrators to handle our great systems developments—computers, missiles, communication satellites. This type of man, who knows both the technical and the administrative side, is one of our greatest shortages."*

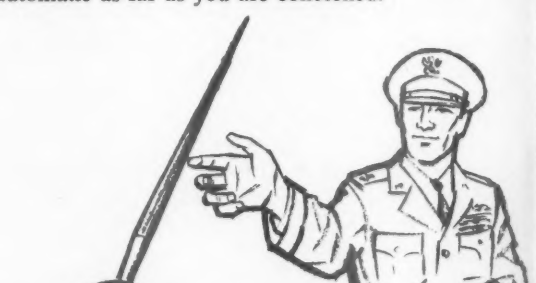
Important as these new requirements are to the effective functioning of operational units, the same climate of requirements will prevail at all levels of command. During the years ahead it is inevitable that the Air Force will live in much greater proximity to the scientific community. Officers engaged in military planning will require an increased understanding of the role of science in public affairs and the background of scientific thinking as it bears on public policy. Further, it will be necessary for the Air Force to keep the scientific community continuously apprised of its objectives and policies.

What can you do, as an Air Force officer, to prepare yourself for the changes taking place?

Many officers have already taken the initiative by enrolling independently for formal courses at a university. Hundreds of others are entered in the Institute of Technology and are pursuing studies at colleges all across the nation, from Cal Tech to the Massachusetts Institute of Technology. The number of these students is growing each month.

There are two major steps the individual must take to place himself officially in an institution of higher learning. The first is to establish academic eligibility. Write directly and privately to the Commandant of the Institute of Technology at Wright-Patterson AFB, and ask him for an evaluation of your academic credentials. He will reply with a letter of eligibility stating the courses for which you can compete. If you are not eligible, he will suggest things to do to become eligible.

When you receive the letter of eligibility send it, directly and privately, to the Schools Branch of the Directorate of Military Personnel, Hq USAF. Your military performance will be evaluated. If you are not accepted, you will be notified privately of the reasons. If you are accepted to compete the remaining action is automatic as far as you are concerned.



Here, essentially, is what happens. The year in which you can be released from duty to attend school is determined on the basis of Air Force requirements. Your commander will be asked to comment on the application. If you are marked for school within a two-year period you are frozen in your present assignment. If you are marked for possible entry two to five years away, you are not frozen, but your commander is notified that you are being considered for a given year and your file is placed in suspense. A selection board at Headquarters, USAF, makes final selection of the students to be entered in an Institute of Technology program.

Approximately 1,500 officers will earn their degrees with the close of the current school year under the Institute of Technology program. Not only will they bring greater competence to the Air Force as they return to duty assignments, but their personal lives will be richer, broader, and more rewarding.

*Think, Sept. 1960. A Visit with Dr. James R. Killian by Arthur Herzog, pp. 22-23.

Hustler

by DAVE KARTEN, Airman Staff

EIGHTEEN YEARS AGO—on August 17, 1943—the major helped knock the ball bearings out of the German war machine in the historic attack on Schweinfurt.

"We had 315 B-17s out that day on the Schweinfurt-Regensburg double mission, took about six hours to get in and get out, and came home with 60 less *Flying Fortresses* than we started with."

He bit the end off his perpetual cigar, spat it toward the gleaming B-58 *Hustler* poised on insect-like legs. The plane had a hunched, tense look. Its nose was a sharp metal spike and the leading edge of its delta wing curled downward a little, suggesting a cobra's hood. But even when it was standing still it seemed to be moving, and when its engines opened wide, it snapped forward like a toy on a rubber cord and leaped into the air at a sharp angle.

"With that bird," the major continued, "my crew and I could have done the job alone. We'd have dashed in and out in 35 minutes—that figures out to about 1,400 miles an hour. Which is hustlin'."

Hustlin' it is. Since January 1 the B-58 has hustled through eight different world speed and payload records. On the most recent record hop the *Hustler* flashed over LeBourget Field—where Charles A. Lindbergh landed 34 years ago—and set down 6 hours 15 minutes after taking off from Carswell AFB in Texas.

The delta-wing bomber made the New York-Paris leg of the 3,669-mile-trip in 3 hours 19 minutes 41 seconds. Its speed (average: 1,050 m.p.h.) was nearly ten times as fast as Lindbergh's, who covered the 3,600-mile distance in 33 hours 29 minutes 30 seconds. The needle-nosed B-58 was refueled twice—once near Newfoundland and again near the French coast.

Earlier this year a three-man SAC crew from Carswell's 43rd Bomb Wing streaked their four-jet *Hustler* around a 1,000 kilometer course over the California-Arizona desert at an average 1,284.73 miles-an-hour to set three new world speed records, taking two of them away from the Soviet Union. Their maximum ground speed on this record-breaking flight: a blistering 1,430 miles-an-hour.

Hank Deutschendorf wasn't on the Schweinfurt-Regensburg raid, but he has flown B-17s; and the B-50, B-29, B-24, B-47, TF-102, . . . and the B-58.

In fact, two days before the B-58 hit the 1,430-mph ground-speed mark on January 14, Major Deutschendorf piloted the *Hustler* through three world speed records for the 2,000 kilometer closed-course, and three for a 1,000 kilometer closed course. Streaking over the California-Arizona desert from Edwards AFB, Calif., to Gila Bend, Ariz., and back, his plane hit 1,200 m.p.h.

What does it feel like to fly a "routine" mission at Mach 2?

"I notice no physical difference in supersonic flight,"

Crew of New York to Paris record hop: Maj. Wm. R. Payne, A/C; Capt. Wm. L. Polhemus; and Capt. Raymond Wagener

the major says in the matter-of-fact manner of a man who has spent half of his Air Force service as an instructor pilot.

"You've got to remember that at Mach 2 you are covering about 20 nautical miles per minute and you have to stay mentally ahead of your plane. If it gets ahead of you, it's almost impossible to catch up."

After each record-breaking mission the pilots reported, "A routine flight." But General Thomas S. Power, SAC Commander in Chief, called the flights "dramatic demonstrations of the bomber's capabilities; evidence that the B-58 can react with speed and be counted on to conduct assigned wartime missions successfully."

Phasing in the supersonic B-58 has increased the target penetration capability of SAC's manned nuclear delivery force. Not only can the *Hustler* penetrate to targets in the enemy heartland at more than twice the speed of sound; it can do it at great altitudes.

Versatile Bird

"In one B-58 today, we could make three missions in the time it took us to make one in the B-29s we flew over Japan near the end of World War II."

These are the words of Lt. Col. L. M. Legge, a B-58 pilot of Carswell's 43rd Bomb Wing. He knows what he's talking about — since he's a veteran of B-29s, B-58s, and other type aircraft.

On March 25, 1960, the colonel and his crew flew a B-58 non-stop simulated bombing mission that covered more than 11,000 miles before they touched down again at Carswell. The flight took 18 hours 10 minutes.

Ever since the *Hustler* was first rolled out on November 11, 1956, its performance has caused a flurry of tactical recalculations. A few ultramodern fighters may be faster in short spurts but they would have trouble climbing from the ground in time to catch a *Hustler* at high altitude. Supersonic F-102 fighters must use their afterburners, at heavy cost in fuel, to stay anywhere near it.

The B-58 can also make penetration bomb runs at tree-top levels. On one such flight, a *Hustler* hedge-hopped across four western states in a revealing demonstration that it can sneak under radar defenses to strike at vital enemy bases. Flying slightly faster than a bullet fired from a .45-caliber pistol, the delta-winged bomber completed the 1,400-mile low-level mission in two hours. "No wonder people on the ground had trouble recognizing us," the pilot reported afterward.

Never more than 300 feet above the terrain, the B-58 reached Edwards AFB, completed its simulated attack, headed into the stratosphere and returned to Fort Worth without refueling. Total round trip time: 4 hours 3 minutes.

What Makes the Hustler *Hustle?*

The B-58's speed—its cruise speed is higher than any previous bomber's top speed—is partly due to its "conical camber" delta wing, partly to the concentrated power of its four GE J-79 engines (jet thrust: 62,400 pounds). The delta wing also adds to its performance flexibility. The large triangular shape provides wing thinness and sweep-back required for supersonic speed at high levels without sacrificing wing volume needed to carry large quantities of fuel. The wing affords structural rigidity and stability when the plane is flying low-level missions in turbulent air.

The B-58 needs no flaps or other high-lift devices for takeoff and landing. Like other deltas, the B-58 has no horizontal tail surfaces. Elevators are combined with ailerons in "elevons" situated along the trailing edge of the wing.

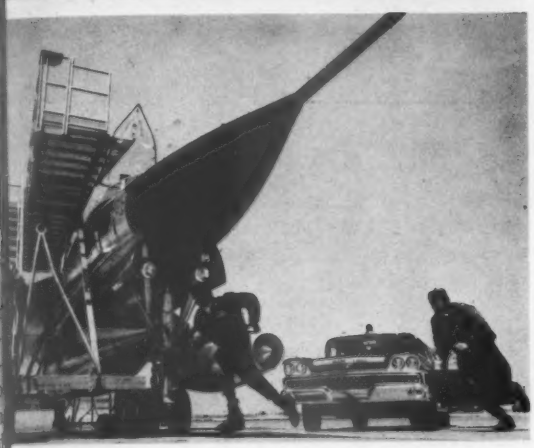
And power steering? When a *Hustler* pilot moves the control stick, the elevons are moved by a flight control system with power equal to 500 Cadillac engines running at full throttle.

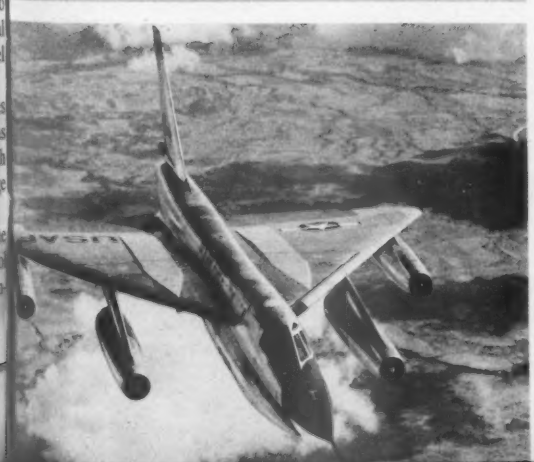
Effective airpower has its roots in good maintenance. Weapon is ready to go as the crew chief signs it off.

Thoroughly trained professionals, B-58 aircrews have demonstrated ability to "roll" in under three minutes.

Aerial refueling capability, by day or night, provides the Mach 2 B-58 Hustler with virtually unlimited range.

The delta-winged bomber can deliver a nuclear weapon from 60,000 feet, or can approach target at 500 feet.





The fuselage, shaped like a slender hourglass, is an application of the "area rule," a design concept that permits easy passage of the plane through the shock waves that build up abruptly at the speed of sound.

Goodbye Boxcar

The *Hustler* reverses the trend toward larger manned strategic aircraft. This was possible because greater power from smaller bombs opened the door to smaller, more effective aircraft.

Until now, bombers were designed on the same principle as boxcars or furniture vans—the body large enough to surround the cargo. In a break with tradition, the fuselage was made only large enough to house the crew and the flight systems. A "disposable bomb bay" streamlined pod, designed as an external attachment to be dropped over the target, lets the *Hustler* fly home "lean and fast."

This provides mission flexibility. In addition to the free-fall bomb pod, a basic B-58 can be fitted with pods filled with reconnaissance gear or electronic countermeasure equipment.

Automatic Airplane

The *Hustler* is equipped with special aids for automatic control. The control system literally thinks ahead of the pilot, preventing him from any maneuver that—at the airplane's fantastic speed—could instantly destroy it.

The three-place medium bomber's performance is enhanced by sophisticated electronic systems automating most of the flight processes and provides a high degree of accuracy in navigation and bombing.

An inertial bomb-nav system, invulnerable to countermeasures, frees the crew from the necessity of making detectable earth checks, although radar fix and astro-tracking systems are also available for check and standby.

Upper component of two-part armament pod nestles into canoe-like cavity.

Prior to training in B-58, pilots first receive instruction in F-102 "Delta Dagger."

Navigation and bombing presented unusual problems. On the B-58 they were solved by a Sperry (AN/ASQ-42) system that uses active radar navigation during a mission's approach phase, with inertial and star-tracking methods while over enemy territory. The 1,948-pound system uses an analog computer that receives data from search radar in the nose, an astro-star tracker amidships, a doppler radar in the tail, inertial sensors, and radio altimeter.

Sitting at his console behind the pilot, the bombardier-navigator receives continuous and precise information on aircraft position, heading, ground speed, altitude, steering data, and distance to target, as well as ballistic computations for weapons release. Radar beacons permit the B-58 to rendezvous with its jet tanker day or night, giving the *Hustler* greatly increased range.

The Training Crews

Crack handpicked aircrews for the USAF's two wings of B-58 bombers—the 43rd Bomb Wing at Carswell and the 305th at Bunker Hill AFB, Ind.—get their supersonic aerial know-how in three months of intensive training at Carswell's 65th Bomb Squadron Combat Crew Training School.

The Fort Worth CCTS produces "select of the select" aircrews to man the fast, sophisticated medium bomber. Students are the "cream" of SAC crews.

Candidate selection is made from a thorough study of their records, not by "numbers." Graduates of the "for veterans only" school have an average of 5,000 flying hours. The majority are former B-47 pilots. All are volunteers for *Hustler* duty who have been recommended by their wing commanders.

A pilot must have at least 1,000 hours of jet flying time before he can qualify. And 500 hours of this time must have been flown since he was upgraded to aircraft commander status in a SAC multi-engine bomber or recon jet aircraft. He must also have served as A. C. for a year on a SAC senior or select crew.

The navigator is required to have 500 hours in a SAC multi-engine bomber or recon jet aircraft and must also have served for a year on a SAC senior or select crew.

The Defensive Systems Operator (DSO) must possess 200 hours on similar aircraft and six months experience as an Electronics Warfare Officer on a SAC senior or select crew.

Tough Course

Before he comes to Carswell, a *Hustler* candidate must complete his "lead-in" training.

A pilot gets six weeks of T-33 and TF-102 "delta wing" flying, primarily on instruments, at Perrin AFB, Texas. "Lead-in" for the navigator-bombardier is an eight-week course at Mather AFB, Calif., on bomb-nav systems and hardware.

The DSO, who occupies third station in the *Hustler*, attends a B-58 pre-entry course on his equipment at Keesler AFB, Miss. He operates the remote control turret and acts as performance engineer, in addition to his ECM duties.

After this lead-in training comes three months—actually 60 working days—of crew training, described by students as tough.

"We're flying one of the fastest, most versatile planes aloft," an instructor tells the trainees, "and constantly evolving new tactics and techniques to fit this unique bird."

The first 21 days are spent in "academics," where crewmen learn about the *Hustler's* sophisticated subsystems.

Flights in the TF-102 ("to get the hang of flying delta wings") and 21 hours of "flight" in the school's flight simulator are next for the pilot.

The realistic flight simulator consists of a cockpit, identical to that of a tactical *Hustler*, and an adjacent control panel, from which the instructor feeds "malfunctions" into the plane.

Simulator training is realistic. On landing the trainee assumes a slight nose-up attitude. This, plus the "screeching" of brakes hitting the runway, climaxes a flight that is practically identical to the real thing. *Hustler* pilot trainees will tell you.

The "Hustler" needs no flaps or other high-lift devices for takeoff and landing. Design permits easy passage through the shock waves.

"And it's a lot cheaper," claims Maj. Thomas C. Clodfelter, chief of the air training branch. "It only costs about 50 cents for the electricity."

Maj. G. J. Nelson, chief of synthetic trainers, says Nav-Bomb and DOS simulators will soon be installed in the same room with the pilot simulators.

"When this is done, we'll have an entire crew flying an integrated training mission together, with each man receiving fed-in problems peculiar to his station."

Feeding the problems into these simulators will be a B-58 instructor crew whose two-sided function is to fly combat sorties and follow a new crew throughout CCTS.

These crews accompany the student crews through pre-flight briefings, monitor their flights, greet them on landing, and conduct the post-flight critiques.

When they have completed their simulator hops, student crews make two flights in the trainer *Hustler* (TB-58), equipped with interchangeable controls between first station (Instructor Pilot), and second station (Student Pilot).

On the second flight, the student crew gets a pre-solo evaluation by the school commander, the wing commander or his deputy.

Given the green light, the student crew makes eight more flights in a tactical *Hustler* before it emerges as a well-trained trio ready and qualified to deter aggression in the world's fastest bomber.

Reliable Effective Weapons System

In August 1960 the B-58 became operational as part of the SAC force. Six weeks later in SAC's annual combat competition the 43rd Bomb Wing challenged SAC's 12 top units, captured fifth place in overall standings, chalked up the best pair of radar bomb scores and top individual high-level navigation run.

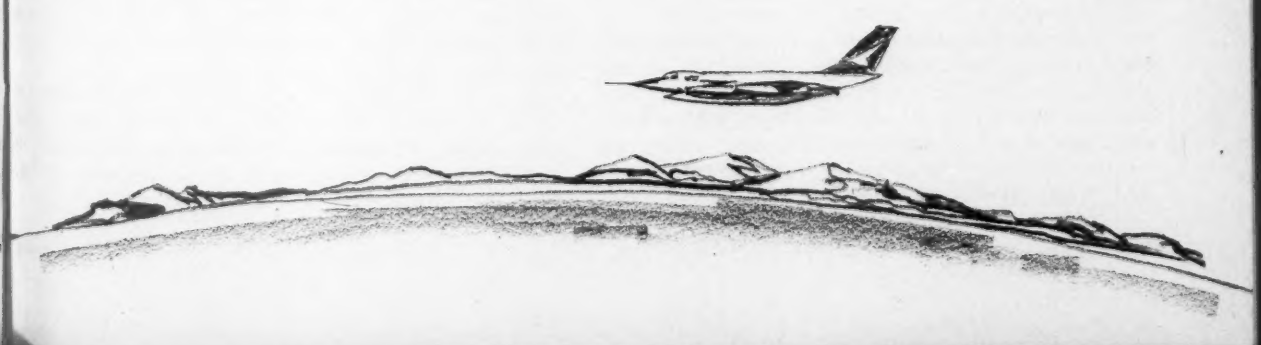
The B-58 crews in the 1960 SAC bombing competition were in a class by themselves in "scrambling." (Scramble is the time required for flight and maintenance crews to get the *Hustler* "in motion" after dashing in from the flight line.)

One crew had the B-58 "rolling" in 2 minutes 10 seconds—almost half the time required for most other aircraft in the competition. A second crew went through their paces in 2 minutes 5 seconds; got the bomber in motion well within alert time requirements.

What of the future of aircraft like the B-58? Will the intercontinental missile become the "ultimate weapon," and make the manned bomber obsolete?

Today, Air Force doctrine foresees employment of a mix of bombers and missiles for some time. "For the foreseeable future," says Gen. Thomas S. Power, Commander in Chief of SAC, "manned bombers will have to be used for missions which entail reconnaissance and on-the-spot decisions, for attacks against well-protected and concentrated targets, especially if their location is not accurately known."

Until the 2,000-miles-an-hour B-70 bomber becomes operational, the B-58 will remain the USAF's only supersonic bomber. It is a reliable, effective weapon system manned by some of the world's most experienced airmen—a powerful deterrent to armed aggression.



THEY MEASURE THE EARTH

Across the Arctic's frozen wastes, through steaming jungles, arid deserts and over the oceans of the world, APCS astrogeodesists work to support America's exploration of space.*

By STANLEY C. JENSEN, Hq APCS
Photos APCS

EVEN as you are reading this in the peaceful quiet of your GI bunk, you probably know that you and your surroundings are actually in a state of violent motion. The earth is spinning like a top on its axis at a speed of something better than a thousand miles per hour. The speed will vary depending on the season and your precise location. In addition to this motion, the busy planet rotates in orbit around the sun, covering millions of miles in the 365-day cycle. To complicate the matter still further, the earth rocks as it rolls on its axis, and the entire formation of heavenly bodies is sweeping through space at a terrific rate.

All of this points up the fact that when a USAF space team undertakes to shoot a capsule to the moon, or place a vehicle in orbit around the earth, they are faced with some tricky problems in mathematics. Even the relatively pedestrian feat of lobbing an astronaut 200 miles down the Atlantic Missile Range poses a staggering requirement for precise calculations.

In approaching this new area of spatial geography, it obviously becomes necessary for the space scientists to understand the characteristics of the earth. As an example before launching a probe from Cape Canaveral or Vandenberg, they must know precisely the location of the launch site in the cosmic sense, or they could miss the moon by thousands of miles. Further, the position of tracking stations in relationship to each other must be established to the accuracy of the proverbial gnat's eyebrow. It doesn't help at all to know that Canaveral is 200 miles from Miami, or whatever the distance is. A great portion of the geographical information gathered by earlier generations is, in fact, too inaccurate for use in the space age. This is where the astrogeodesists of APCS enter the picture. For seven years these teams have been assembling information from the far corners of the earth.

The science of geodesy itself is not new. Essentially it deals with the mathematics of the earth's shape and its physical properties. In the United States, many highly accurate measurements have been made by the U. S. Coast and Geodetic Survey, a division of the Department of Commerce. For instance, from their surveys it is entirely possible to determine, within a few feet, the distance from the handle of a mailbox in New York City to a particular rivet on the Golden Gate Bridge. Similarly, most of Europe has been surveyed with the same degree of precision.

But in the intricate business of space exploration, it is necessary to consider the earth as an entity. There's

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**Webster's dictionary does not recognize any such word as astrogeodesist. THE AIRMAN and APCS are pleased to donate this new word to the language as an apt description of the specialty performed by these enterprising teams of airmen.*

In far-away places of the world—under tropic sun and in Arctic cold—the astrogeodesists of APCS carry out their missions under all extremes of climate and circumstances.

Perspiration shines on face of SSgt. James E. Roach as he looks through theodolite, an instrument used by the geodesists to trace a network of accurate measurements.

a need to correlate all the different geodetic networks of the world to produce a single—universally applicable—system through which any point on the earth or in space can be located with accuracy. If, for example, signals from a Canaveral-launched space probe are to be picked up by Jodrell Bank in England, knowledge of the exact geographical relationship between the two places will make the signals more meaningful.

But until the Air Force geodesists went to work, there was no way of satisfactorily relating the measurements of one continent with another; it couldn't be done by conventional means.

The most common conventional method is the system called triangulation. Essentially, this is how it works:

A survey team measures a base line several miles long very accurately with steel tap. At each end of this base line they set up a telescopic instrument called a theodolite. Through the two telescopes they can then sight on a single point a few miles away. The base line and the two lines of sight create a triangle, from which the system gets its name. By measuring the angles formed by the base line and each of the lines of sight, the team can compute the distance from each end of the base line to the distant point.

By moving one of the instruments to the distant point, leaving the other at the base line station, a second triangle can be formed with a new point and another distance determined. By leapfrogging the instruments from new point to new point, a chain of triangles is created by which overland distances of several thousand miles can be measured.

But triangulation is a long, time-consuming process, and is confined to measurement of surfaces where line of sight can be used. Jungles, mountains, and bodies of water pose obstacles to this method. It is unsuited for the space-age requirement for accurate points of reference on a global scale.

Hiran Fills the Need

The Air Force might still be puzzling over this problem of measurement were it not for the introduction of a device called Hiran. Hiran can accomplish, in a matter of hours, more work than a score of ground survey teams could do in weeks. And it works over water, mountain, ice cap, jungle, desert—anything.

Starting from an established point in Canada, teams from the Air Photographic and Charting Service, several years ago, strung out a system of ground stations across Greenland, into Iceland, and over other smaller islands to Europe. The only restriction involved was that the stations had to be less than 550 miles apart—the effective accurate range of the system.

By flying special electronically equipped aircraft back

and forth between the ground stations, the APCS airmen could come up with extremely fine measurements between each pair of stations. By adding the increments together, they then arrived at a reliable total distance.

But simple as it may sound, this kind of work is not without its share of problems. It's much faster than conventional methods, but the ground station operators, for example, spent months on top of the Greenland Ice Cap, their only company the electronic signals from their equipment, their only visitors were Arctic birds and animals or the occasional planes dropping supplies. And at other times the job takes them into the Amazon rainforests where they may live for half a year among tropical snakes and backcountry headhunters. Several teams have been located in spots where the only access was by sling from a hovering helicopter.

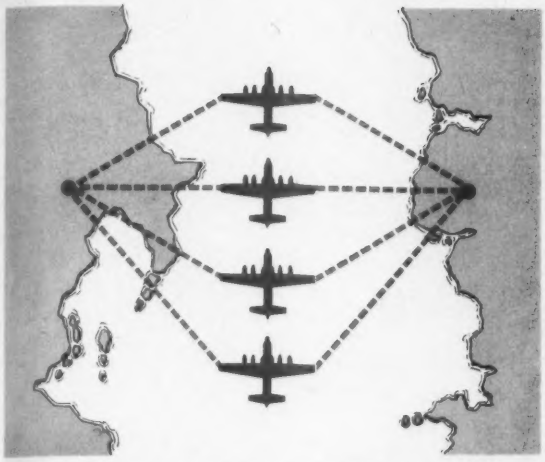
But the hardships imposed are those of nature, terrain and isolated frontier living. APCSmen receive full cooperation from the governments of the countries in which they operate, for the information they gather is of value not only to the United States but to the nations concerned and to scientists and engineers the world over. Theirs is a contribution to the international geodetic program through which all nations can reap the benefits of being connected to a single geodetic system. Without cooperation, the operation would cease, for no single nation, regardless of size or resources, could go it alone.

And for the nations in which APCSmen measure, there are even more direct benefits. Frequently, their public works men are obtaining, for the first time, accurate information as to directions and distances within their own borders. With the aid of this information they can plan hydroelectric projects, highways, power transmission lines, railroads, water supply systems—all the things needed by a vigorously expanding young economy.

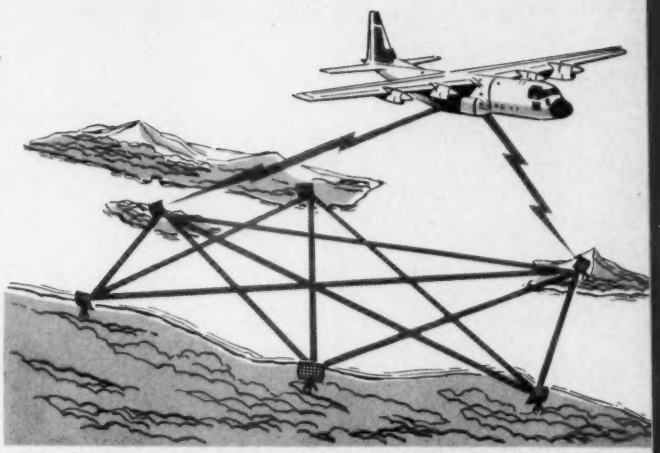
And through their measurement chores, the men of APCS are sowing these benefits throughout the Free World. The geodetic tie across the North Atlantic was only a part. Accurate surveys are being made in both the Atlantic and Pacific test areas to assist in providing necessary data for space research. In addition, accurate reference points have been established internationally.

Reason for the world wide interest stems from the fact that modern science, faced with the challenges of the space age, found that the store of reliable knowledge about the earth was, to say the least, sketchy, sometimes misleading. School books and encyclopedias give the facts, but they are not precise, and in many

The stellar or ballistic camera holds great promise of solving some of the problems of APCS geodesists. SSgt. Joseph Benson operates camera with support of A1C George Lavalli (kneeling) and SSgt. Norwood Sloan.



Hiran system uses airborne transmitter and two ground stations. Signals are sent to ground receivers and returned to aircraft. Time lapse of bouncing signals provides information upon which measurement is made.



Information is verified by measuring triangle of lines. Dimensions of triangles, as rigid geometric figures, must conform with geometric laws. Over the operating range an error of closure less than 15 feet is maintained.

cases wholly unrelated to each other. Here is one example of how the characteristics of the entire earth enter the picture.

When measurements are taken between any two points on the surface of the earth, the line must follow the earth's natural curvature. But a space effort such as the manned *Redstone/Mercury* flight of May 1961 follows a subspace flight path independent of the curvature on the surface. If the capsule is to land in the pre-planned drop area, compensatory information must be cranked into the guidance system of the vehicle. For this reason, accurate knowledge of the diameter of the earth is necessary. During the past hundred years or so, no fewer than a score of estimates has been given for this measurement. Surveying on a global scale, accompanied by constant checking and rechecking, is the only way to arrive at this ultimate answer.

Variable Gravity and the Space-Age Yo-Yo

For many years it was popularly believed that the force of gravity was the same at all points on the earth. Prior to the space age, few bothered to disturb this belief, but it has now been established that the force of gravity does vary. A man or a space missile can jump higher from some places than from others. In the case of a man the difference is barely measurable. But in a space vehicle developing several hundred thousand pounds of thrust, the difference could mean overshooting the programmed orbital path, among other things.

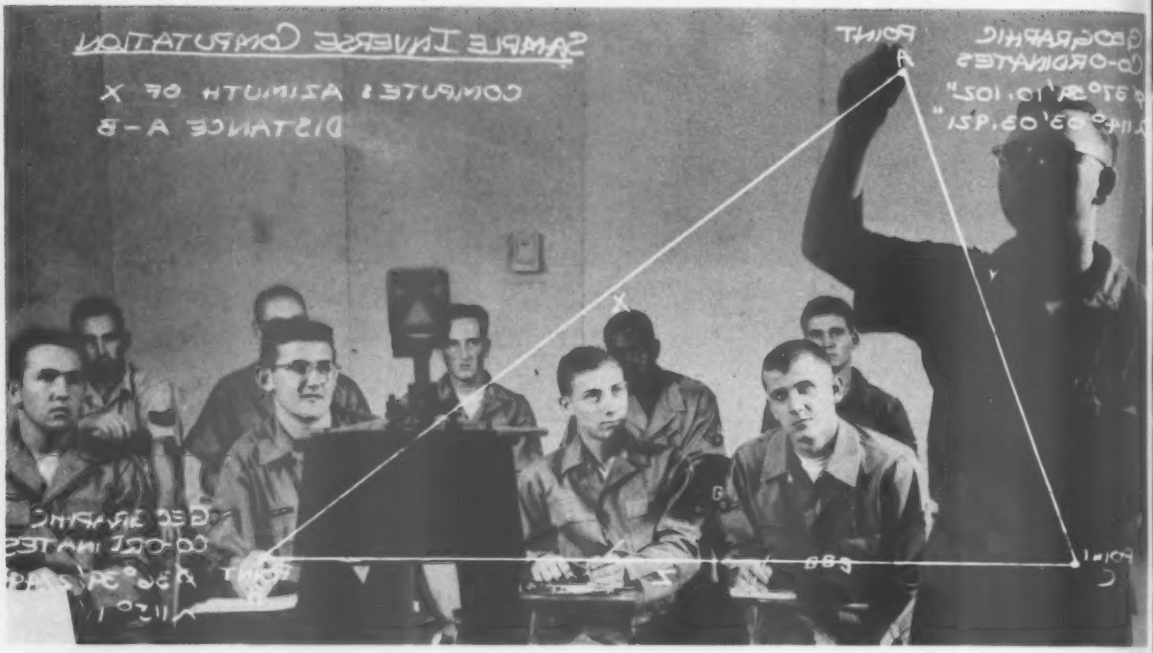
Thus APCS geodesists must measure gravity. The instruments they use for this task at present are almost primitive in their simplicity. They do the job—but slowly. The gravity tool consists basically of a weight suspended on a spring. By dropping the weight and noting how far it falls and bounces at the end of the spring for a period of time, the technician can arrive at a reasonable calculation of the strength of gravity. Of course, dozens of such observations must be made before a conclusive reading can be attained for any point. But plotted on a map, these readings gathered around a particular area serve another useful purpose.

They determine which way is "down."

When a builder sets out to put up a house, he is interested in which way "down" is, for that is the origin of the major strain of the structure. He finds it by using a bubble level or weight, called a plumb bob, suspended on a cord. For his purpose, the plumb bob serves well.

But the space-age geodesist is interested in "down" for a different reason. He wants to find "down" only as a means of determining which way is "up." And "up" in the space business is not some vague skyward direction. Small gravimetric and positional inaccuracies could mean thousands of miles of error on a journey into space. The plumb-bob method of the builder is not good enough for this measurement since gravity—besides being irregular in intensity—doesn't always pull down straight to the center of the earth. Such things as heavy underground ore deposits can pull the plumb off. There are other headaches associated with a dependable "down" that only time and further research will cure.

Again, however, the problem is one that is international in scope and one that has generated amazing international cooperation. More than 35 nations are now working closely in the USAF-sponsored Worldwide Gravity Project, and since 1950, a total of 55 nations have made contributions of information aimed at filling the gaps in our knowledge of the earth's gravity field. But even with all this cooperation, the gaps will remain large for some time to come, for the accuracy



required takes infinite care and many, many manhours of painstaking, tedious repetition.

Check and Double-Check

For instance, everytime the APCSmen take a measurement, they repeat it and repeat it. This is not because it was not right in the first place, but because their results must be as accurate as humans can make them.

Take the case of the Hiran measurements. When the specially equipped aircraft are flown between each pair of ground stations, crews make six measurements at one altitude and six measurements at another. Only if all 12 closely agree is the distance determination accepted.

And this meticulousness extends into everything they do. So complex are the problems of the earth-measuring business that many forms of surveying and cross-checking are used to hone precision to an even finer edge. As new methods and techniques are developed they are applied to the solution of ever-expanding geodetic problems.

There is now being tested an airborne gravity meter. With it, the geodesists will be able to fly over the earth and, in essence, mass produce gravity maps in much the same way as conventional charts are developed from aerial photography.

There are also astronomic devices coming that do not depend on "up" or "down" and are not limited to the 550-mile range of Hiran. One is the Geodetic Stellar Camera.

This device simply takes a picture of an area of sky through which a flare-carrying space vehicle passes. The flares ejected by the vehicle appear as tiny blips on the exposed photographic negative; and, of course, certain stars will make an image too.

By setting up three cameras—two at precisely known locations and a third about a thousand miles away at a location to be determined—and photographing the flares against a star background, the location of that third point can be precisely established. It works this way. On the pictures taken by the cameras at the known locations, the geodesists calculate the positions of the flare bursts since they know their own position and those of the stars in the background. The picture from the third camera will have the same flare bursts and also a background. Since the locations of the stars are known and the location of the flare bursts have been determined, the location of the third camera can be calculated.

What all this spatial triple play means is that a giant step will be taken in the advancement of our world geodetic effort. Overwater distances that have defied even Hiran can be surveyed quickly and efficiently. The overall end result, of course, is better information to support the space programs.

Further on the horizon is another piece of equipment—the geodetic satellite. With it, geodesists hope to obtain a truly accurate measurement of the size and shape of the earth. When they get that, the universal reference system can be recomputed and refined to even further hairsbreadth accuracy.

Men and Planes

Now on the job are approximately 1,750 airmen. Within the worldwide photo and charting organization they are divided into two basic groups. The 1,500 men and women of the 1370th Photo-Mapping Wing at Turner AFB, Georgia, have the responsibility for the

edgling APCSmen receive hours of intensive classroom struction before being assigned to a team for more vanced training in variety of geodetic specialties.

Close work by geodesists such as A2C John Meyn adds to store of information on gravity. This meter measures the minute irregularities in gravitational attraction.

Hiran measurements and a number of other related jobs as well. Flying 15 RC-130 and 15 RB-50 reconnaissance-type aircraft and operating numerous ground stations, it is their job to operate the 550 mile electronic measuring tape. They have been at this for several years and are experts.

Younger in organization terms but no less expert are the nearly 250 airmen of the 1381st Geodetic Survey Squadron at Orlando AFB, Florida. In contrast to the men of the 1370th who make long distance measurements between established geodetic reference systems, the men of the 1381st are the technicians who supply precise survey data when and where required. These are the men who two years ago did not exist as an organized group; and who, for the most part, had never seen half the equipment that is today a part of their daily lives.

The tellurometer, operated by SSgt. Curtis Barfield, is based on a system similar to Hiran. It measures precisely line-of-sight distances of miles in length.

How did they get so good so fast? The answer is training and a cooperative parent command.

In mid-1959, when the APCS mission was expanded to include unique surveys of AF installations and gravity determinations, the new Geodetic Survey Squadron consisted of a handful of airmen with a hatful of problems. The complexities of geodetic math prohibited random selection of trainees and the needs were hotly competitive with similar shortages throughout the Air Force.

The APCS parent command, the Military Air Transport Service, came to the rescue. Sifting through the existing manpower supply, personnel men came up with enough enlisted men and officers with the proper background to form the backbone of the new squadron. APCS itself supplied some key people from its own resources and both MATS and APCS siphoned off the superior math and engineering types entering the manpower pool through the ATC and ROTC pipeline. But the real job was accomplished through an unparalleled training program that has bootstrapped the squadron to its present peak of skill and efficiency in surveying.

Starting a new class of 20 men every two weeks, the squadron training staff maneuvered the few but brilliant instructors through a maze of teaching schedules that could make chess seem like a kindergarten pastime. Each teaching cycle consisted of an intensive 10-week course divided into 40 percent class work and 60 percent practical field work. And to while away the time before their own class of 20 was set to begin the cycle, the late-starting students were given an opportunity to enroll in a seven-week refresher math course established at a central Florida college.

How good was the training in so short a period of time? The answer lies in statistics—94 of the first batch of 97 students graduated, and 83 of those passed "3-level" examinations a few months later.

But the training didn't stop there. Each of the 94 students has been assigned to a 12-man field team and along with him came a very exacting personal evaluation by the instructors. This evaluation serves as a guide to team leaders—the seasoned men of the squadron—in determining further training needs for each man.

The training of new officers was equally exacting. The 10-week course was expanded to 25 weeks and included proportionately more detailed study.

Altogether the astrogeodesist career field can hardly be described as a plush or comfortable specialty. Most of the men can look forward to five or six months of TDY each year, probably in some spot completely bypassed by the march of civilization. But it is rewarding work. When the first man sets foot on the moon, these airmen will share some of the credit for putting him there.

Rx for Life

Before man can survive in space, the flight surgeon and other scientists must prescribe remedies to protect him from hostile forces.

by CMSgt. EDISON T. BLAIR, Airman Staff

A SUN-TANNED JET FIGHTER PILOT returned to Selfridge AFB from a tactical training mission late in a spring afternoon of 1949. He dashed into Operations, debriefed hurriedly, then rushed off to the base hospital.

He wasn't sick. His wife wasn't having a baby. The 28-year-old pilot was simply late to begin his tour of duty as Medical Officer of the Day.

Lt. Col. Burt Rowen is a senior pilot today; still qualified in the newest jet fighters; still sun-tanned; and a Chief Flight Surgeon. But he no longer pulls MOD duty, because he has been Chief of the Bioastronautics Branch of the Air Force Flight Test Center at Edwards AFB since 1956, and bioastronautics coordinator for the X-15 program since 1958. His office is still close to the flight line—first door down the hall past the Flight Test Engineering Division.

Right now he is helping plan the bioastronautics program for *Dyna-Soar* and other future space craft.

Bioastronautics, in case you don't know, is a term applied to the collective life-science disciplines needed to support a man in a hostile space environment. The X-15 cockpit is a hostile environment as Maj. Bob White can tell you from personal experience.

Surrounded by airless space and pressurized with gaseous nitrogen, the X-15 pilot gulps his life-sustaining oxygen a lungful at a time from the pressure bottles that feed his faceplate. Then there are G forces and weightlessness; aerodynamic heating and solar radiation; the psychological feeling of being alone in another world; and the blinding glare of unfiltered sunlight. Devising, testing, and maintaining life-support systems to combat these effects of high altitude and space flight is the job of the bioastronautics people.

But the X-15 has only half the capabilities of *Dyna-Soar,* Dr. Rowen explains, and the life support problems are still increasing. The problems of G forces and temperature alone will be three times greater in *Dyna-Soar.*

"We learn a lot before the plane ever flies," said Rowen. "We think we have a lot of the bugs worked out. But this isn't necessarily so. Devising a system, then testing it until it is reliable, is a prolonged process that we do one step at a time. Men's lives depend on how well we do the job."

Bioastronautics work at Edwards was started by Colonel Paul Stapp who still retains his 1957 title of "The Fastest Man on Earth." The emphasis on bioastronautic research has changed and the concept is still growing, but the objective remains the same—support man in flight. This is the same objective that aeromedical research had in its infancy when the perils of pilots first became a medical problem.

The problems have grown, too, and the fields of research have broadened with the advance of aviation. Now with man flying at the edge of space—and his experience—the Air Force's biomedical effort is two-pronged. The USAF Aerospace Medical Center in San Antonio conducts basic research. Bioastronautics units, such as Colonel Rowen's, and other AFSC laboratories, use the knowledge in applied research.

Dr. Rowen began active duty as a lieutenant and aviation medical examiner in the AF Medical Corps in 1946 after graduating from the School of Aviation Medicine, the parent of today's Aerospace Medical Center. He went to the Army's Airborne School at Fort Benning, Ga., qualified as a parachutist, then organized a paramedic team for the Fifth Rescue Squadron where he was squadron surgeon.

Although some flight training is required for an aviation medical examiner's rating, Rowen didn't get his pilot's wings until June 1948 when he completed flying training at Barksdale AFB, La. Today he is one of 15 double-rated physicians (both pilot and flight surgeon) in the Air Force and was among the first to get jet training. Pilot Rowen spent a year in the tactical fighter outfit at Selfridge then returned to the School of Aviation Medicine as an instructor well seasoned by his flying in the field. His jet flying experience, which he keeps current, helped him to understand the problems faced by Scott Crossfield, Joe Walker, Maj. Bob White, and others who have shoved the X-15 to the fringe of space.

"Just having the pilot tell you that 'everything is fine' about his physical condition isn't good enough in space flight," Colonel Rowen told THE AIRMAN. "We have to know just how close he is to disaster every second during the flight. That's why medical monitoring of the pilot in flight is so important."

The monitoring is done via tiny transistorized transducers and sensors. They sense the physical condition of the man as well as his environment and record or telemeter the information electronically. Telemetered physiological data was received on the ground and recorded aboard the X-15 for the first time on May 5, 1960. Most flights since then have collected similar data. The biomedical package had then been thoroughly tested in TF-102 flights for a full year. The package, developed under contract by North American Aviation, enables the flight surgeon to evaluate the pilot's response to speed, altitude, temperature, and pressure as easily as the aeronautical engineer examines the performance data of his machine.

Dr. Rowen has pioneered the telemetering of physiological data during flight in the X-15 program but he states flatly that all future manned space systems will use similar medical monitoring methods. A review of his in-flight information shows that the pilot's respiratory and heart rates were recorded at levels in excess of those anticipated. During the three critical periods of the research flights—launch, burn-out, and landing —the man's heart rate doubles and his respiration rate triples. Body temperatures, however, remained relatively stable at values under 100 degrees due to pressure suit ventilation and cockpit pressurization and temperature controls.

But on at least four occasions partial failure of cockpit pressurization occurred. The pilot survived these incidents only because the carefully designed and reliable full pressure suits tested by the Bioastronautics Branch operated as they should. Dr. Rowen felt encouraged when heartbeat and respiration failed to increase so rapidly on the pilot's second flight. Both rates were reduced temporarily during periods of weightlessness, although they went up again after recovery. This means, Colonel Rowen says, that the weightless state may pose fewer problems than anticipated.

The ultimate goal of Rowen's program is a more refined instrumentation system that will provide still more physiological data and display it in real-time (as it happens) on a console. This is the way aeronautical engineers have received their telemetered information from research aircraft since 1946 when the X-1 program started at Edwards AFB. With a console indicating both the pilot's physiological condition and the aircraft cockpit environment, the flight surgeon would be able to relate responses to environment immediately. If environmental conditions caused adverse physiological effects, the doctor could advise the pilot on corrective action.

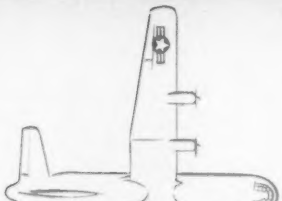
Carefully designed and completely tested equipment is essential to support life in the new environment of space.

Of course this is much the same sort of information and monitoring system now being sought by civilian doctors and surgeons to monitor a patient's condition before, during, and after surgery. In fact, five Veterans' Hospitals are already building variations of such consoles. This tends to emphasize how applied military research in the biomedical fields, particularly in sensors and transducers, is benefiting all humanity while furthering our overall knowledge of the universe.

Colonel Rowen and his bioastronautics researchers are now working as rapidly as possible to expand their inflight monitoring. Several contracts have been awarded for improved and miniaturized instrumentation and hardware. A ground console is being developed and will be ready for testing soon. They are also adding to the system a means of collecting data on blood pressure, respiratory volume, radiation, and partial pressures of oxygen and carbon dioxide in the face-plate.

Based on knowledge acquired to date, Dr. Rowen says there is no physiological barrier to manned space flight. If and when a barrier should appear, he, and the hundreds of other aerospace surgeons who support man in flight, will recognize and surmount it.

TAC OVER THE ANDES



by TSgt. JESSE B. NESBITT, Hq Ninth Air Force

TACTICAL AIR COMMAND, already distinguished for versatility, recently chalked up another "mission completed" in the lush jungles surrounding the headwaters of the Amazon River. The "Blue Eagles" of the 773rd Troop Carrier Squadron, Sewart AFB, Tenn., lent a helping hand to a good-neighbor nation striving doggedly to help itself.

The good-neighbor nation involved is Peru, a democratic republic nearly twice as big as Texas situated on the Pacific coast of South America. Peru's economic problems can be traced principally to the geography of the country, but after many years of struggle against natural obstacles the light of solution is visible in the future.

Peru is a long, roughly rectangular country about 1,400 miles in length by 800 miles wide. From the border with Ecuador in the north all the way to Bolivia in the south, the area is divided by the rugged backbone of the Andes Mountains rising at some points to more than 20,000 feet. Because the rain-bearing winds from the east are blocked by the mountains, the coastal strip of land along the Pacific Ocean is arid, mostly desert, and crops can be grown only with irrigation. But on the eastern side of the mountains, where rainfall is copious, it is said that one need only scratch

the ground with a stick and vegetation will spring up. Much of this area, locked away behind the barrier of the Andes, is covered by mile after endless mile of jungle. The few plantations where coffee and cotton are grown must ship their products to Lima by costly airlift in light planes carrying small cargoes. The mountains themselves are tremendously rich with an unmeasured wealth of minerals. Peruvians have long been aware of the need for roads to join the two parts of their country together. Not only would the mineral resources of the mountains become accessible, but the fertile acres now given over to jungle would provide farmland for the people—thus promoting better standards of life for all. The need was obvious enough, but the obstacles imposed by inhospitable terrain would make angels weep. In some places the roads must climb to 16,000 feet to cross the mountains.

As the result of a request by the Peruvian government, five C-130 *Hercules* transports, workhorse of Tactical Air Command's troop carrier squadrons, moved out from Sewart AFB and crossed the equator into South America. The bright sunshine of early August found them lined up on the flightline at Lima, City of Kings, founded by the Spanish conqueror, Francisco Pizarro in 1535. The mission: to fly road-building equipment—bulldozers, graders, forklifts, and trucks—over the mountains to unimproved, dirt landing strips on the eastern side.

The operation, under command of Lt. Col. Frank L. Weatherbee, got under way on August 2, and ended six days later. In that time 300 tons of machinery were delivered, and the "Blue Eagles" proved the ability of the turbo-prop *Hercules* to operate from unprepared landing fields.

Capt. Lewis B. Senter piloted the lead aircraft of the first flight into Tarapoto about 400 miles from Lima. Tarapoto is in coffee country, and is important to Peruvians. In addition to his cargo of machinery, he was accompanied by Col. Teobaldo Gonzales of the Peruvian Air Force, project officer for the airlift. The road construction is being done by a battalion of Peruvian Army engineers, and Lt. Gen. Guillermo Van Oordt, Chief of Staff of the Peruvian Air Force, was on the ground to greet the TAC crews with an enthusiastic handshake.

A Tarapoto businessman expressed his gratification in practical terms. Mr. Arieh Brodsky ships an average of 1,500 tons of coffee and 900 tons of ginned cotton to Lima every season. Transportation costs alone run to eight cents for every pound, using aircraft of the Peruvian Air Force, the only practical means of getting the produce out of the isolated jungle. Completion of the highway will permit production at Tarapoto to increase more than three-fold in the first couple of years.

Heavy equipment carried over the mountains by C-130s and off-loaded at unimproved landing strips in jungle will permit Peruvians to speed road-building schedule.

The two other villages visited by TAC crews in this Andes airlift were Juanjui and Yurimaguas, and these are even more isolated than Tarapoto. The people at each place—many of them descended from the magnificent Incas—expressed lively interest in the big aircraft and the flying garb worn by the strangers from North America. "In every case," observed one airman riding a *Hercules,* "the C-130s made a low pass over the landing area to see if there were any ruts or other obstacles to be avoided. At the most only a handful of people could be seen on the ground. But when we landed and cut the engines, the woods were full of them. The thatched homes tucked away in the jungle were hidden from us in the air."

Of the three primitive landing strips used, the one at Juanjui was the roughest, but the TAC crews took things in stride. Capt. Charles Haney remarked that landings were no tougher than those on the Greenland icecap where C-130s regularly fly supply missions to Dew line sites.

The Peruvian government paid the United States some $200,000 for the use of the TAC transports, and supplied the fuel for the airlift. For a country with a

Although dust flies in landing, airmen said that operation was no tougher than those conducted on the Greenland ice cap.

Airmen of the 773d Troop Carrier Squadron watch with interest as Peruvians unload tractor flown in by C-130 from Lima.

modest national budget, the investment was not inconsiderable. But authorities announced that completion of the mission cut three years from the schedule of the road-building program and brought their goals that much closer.

The roads leading out from the jungles mean a great deal more than increased shipments of coffee and other products. For the inhabitants, more than half of whom are pure Indian, the roads will bring more of the comforts of civilization and—uppermost in importance—improved public health standards.

The TAC team flying the Andes airlift included a flight surgeon among its members. Dr. (Capt.) John E. Martin of the 773rd Troop Carrier Squadron flew with the crews and observed the medical facilities available to the people east of the mountains. At Tarapoto there is a tiny hospital serving a jungle population of more than 150,000. It is a wood frame building along the style of the old World War II replacement depot. There is nothing so modern as air conditioning, nor is there a modern water supply. Water for the hospital, and for all other users in the village, is carried from the river by burro, on an ancient pick-up truck, or simply on the strong backs of the Indians.

In sun-drenched village street at Juanjui, Dr. (Capt) John E. Martin converses with Dr. Torres (center) and another Peruvian.

At the village of Juanjui Dr. Martin visited the two-bed hospital operated by Dr. Rinaldo Torres, the only doctor serving the needs of 15,000 people. Dr. Torres' practice is unique. To reach his patients, he travels by battered truck, by burro, or simply walks over virtually impassable jungle trails. It is not unusual for him to travel 30 miles to the mud hut of a sick native. The Indians pay him in their own fashion, and when they can. This sometimes takes the form of cleaning the tiny hospital, or presentation of a fresh-killed chicken, or some other item of food.

Dr. Torres' medical practice is sometimes complicated by a strange brand of competition. He mentioned an Indian woman deep in the jungle who complained to the spiritual leader of her tribe about stomach cramps. The leader mixed a drink concocted of herbs to rid her body of evil spirits. But the woman grew worse, and as a last resort her friends brought her to Dr. Torres' hospital.

Peruvians of all ages were fascinated by the sight and sound of the "Hercules." Small boys feasted their eyes, and, perhaps, conjured dreams of the future.

Dr. Martin left what medicine he could spare from his kit and presented his colleague with a stethoscope. "He is an excellent doctor," the flight surgeon reported, "and very dedicated. You might say his is a labor of love."

Some day in the not too distant future bright prosperous farms will dot the countryside now covered by the extravagance of jungle. Healthy bronze-skinned children will play and go to school and grow up in a proper environment.

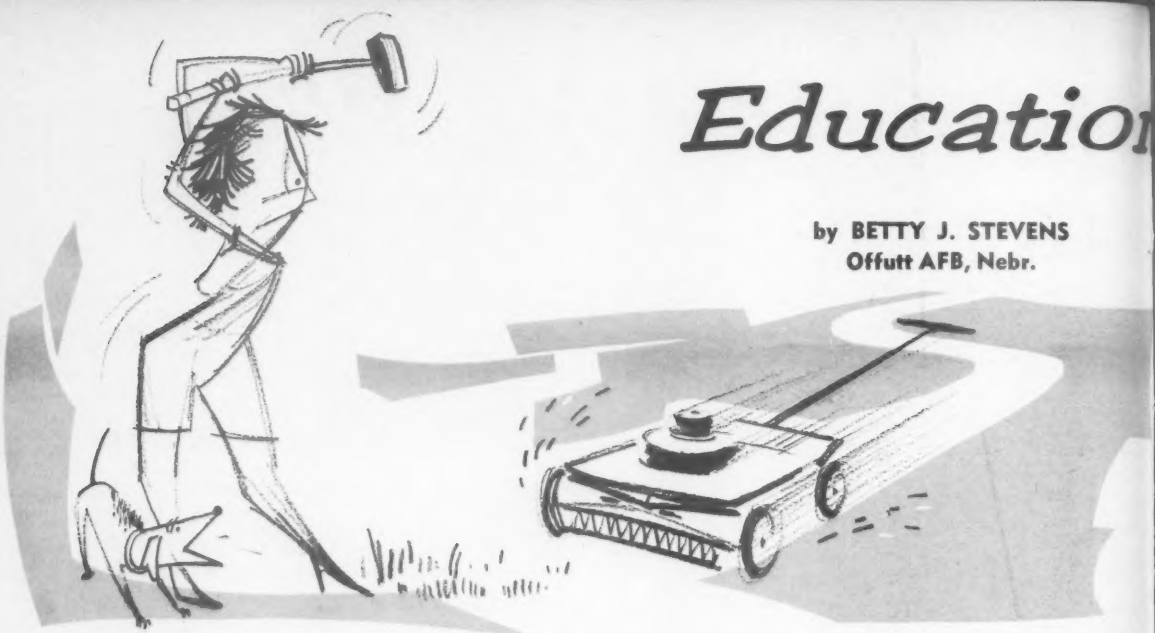
Colonel Weatherbee had this to say at the conclusion of the mission:

"I won't pretend it was a soft touch; it wasn't. But the success of the mission proves two things conclusively. We can operate from unprepared strips if we have to, and our planes can be used to as great an advantage for peace as they can for defense."

Prior to takeoff on return trip from Tarapoto, cargo of coffee is loaded under watchful eye of loadmaster TSgt. Oliver Morris of the 2nd Aerial Port Squadron.

Education of

by BETTY J. STEVENS
Offutt AFB, Nebr.



THOUSANDS OF SERVICE WIVES EVERYWHERE sighed with relief when President Kennedy rescinded the kin-curb order, but many of us only sighed—perhaps with some envy. We knew that husbands go overseas "unaccompanied" for reasons other than the problems of the dollar; there are hot wars, cold wars, police actions, and isolated waystations across the frozen north.

I know about the latter from personal experience. If you are a career family you accept it as part of the business. Not that we're supposed to like these separations, but if we who are left behind are wise, we will glean whatever benefits there are to be had from the experience. In my case it was an education, the like of which could never be found in the Halls of Higher Learning.

Two years ago my husband was sent to Thule, Greenland. The girl he left behind was me, with four children ranging in age from five weeks to 10 years, a car, a house on a small acreage, and a power lawn mower (may it rest in pieces!).

My education started immediately on our return from the airport. The first thing that greeted my tear-swollen eyes was a mouse caught in the trap "Dad" had set the day before. It seems unbelievable now to think that I couldn't empty a mouse trap! For five cents our eight-year-old decided she could. In her attempt she dropped both mouse and trap into the toilet, and it cost me 10 cents to get the 10-year-old to retrieve the trap. We caught a lot of mice that year, and at 15 cents apiece, you can see that I had my own problems with the outflow of gold. On a tech sergeant's pay, I soon gave up hope of attaining a balanced budget.

As time passed I made a lot of progress. Ten months later the "new me" announced: "Children, this week we paint the house." We did, too. In spite of the fact that every time I went up or down the ladder I had to haul the two-year-old off the rungs. I should mention I have a terrible fear of falling, and we have a tall house. Thanks to TV wrestling I learned to hang on to that ladder with a half-nelson and a scissors hold, while painting with my free hand which only periodically retained the brush through a full cycle of strokes. My 10-year-old, who had just discovered poetry, bolstered my resolve by reciting something about strong hearts being made, not born.

For some reason that escapes me now, I never did get around to buying any paint remover. After each day's stint with the brushes, I practically had to bathe in gasoline. The eight-year-old came upon me in the garage in this condition one afternoon. That was the year those awful "sick jokes" were in vogue. "Quick," she cried, "somebody get a match. I'll get the marshmallows." I just throw that in to show that my education was up hill all the way.

...of a Cold-War Widow

Nowhere, but nowhere, do they teach you that

sledge hammers are not used to stop power mowers!

The thing that really drove me the nuttiest was the power lawn mower. I didn't have a bit of trouble getting it started, but I could not get the darn thing to stop! One day it would not stop running no matter how I pleaded. I pushed and pulled every lever, handle, and spring in sight, but to no avail. By this time the dog was charging it from all sides, barking his fool head off. Between the two of them, they naturally woke the baby. I had watched a neighbor stop it once by tapping something on its rear end. So I got the hammer. Actually, it was a sledge. I tapped. Nothing. How much can a woman take? I hit it. It never was the same again. In fact, I hauled it off in a basket.

There are a few things I have never learned, even to this day. What is it about ink that has so much taste appeal to a two-year-old? What sixth sense do visitors have that makes them leave just *before* the furnace starts belching smoke?

One thing I already knew, but which was refreshed in my mind, was that night baseball plus the late, late show will never, never, never take the place of husbands!

Thank goodness not all wives who are left alone are in such dire need of a practical education. There are other things to learn. One of my friends earned the credits she needed for a degree while her husband was overseas. Another seriously took up French (the language). Still another shed 35 excess pounds. If nothing else, a letter every day or two is bound to improve one's handwriting!

Separations, to some lesser or greater degree, are here for good. It is part of the service wife's lot. If things got really serious, of course, the Air Force with its Family Services program and its excellent policy of taking care of its own is always there to help. But only you can handle the routine problems of daily living, and you soon learn that you've just got to roll with the punches.

Between the mouse trap incident and the house painting, I learned a lot of little practical things. For instance, if your car runs out of water, it's best for the block not to drive it to the nearest station, 20 miles up the road. Oh yes, I mean the engine block, not the city kind. Another thing: the Post Office never knows why you're not getting mail from your husband, and furthermore, they really don't care. And wonderful though people are, the best place to find a helping hand is at the end of your arm.

I learned a lot about tools at Christmas time. Vise-grips, I discovered, are even handier than hair pins for fixing things. And would you believe it? A Phillips screwdriver does not necessarily belong to Mr. Phillips, next door. These revelations came with the lovely toys I bought and which were delivered in suspiciously small packages. I was sure I had gotten someone else's order until I opened it. Each box was marked with the most cursed of all words, "Unassembled!"

That made for a long Christmas Eve. At four a.m. I tumbled into my lonely bed and fell into a sleep that was a kaleidoscope of plans, nuts, bolts, instructions and screws. I was convinced I had died, when hark, the herald angels sang, "Merry Christmas, Mama." It was six a.m. "Merry Christmas," I said to them, dragging out of bed. To myself I said, "Bah, humbug!"

Dad had sent a recording to be played immediately after the gifts were opened. It was touching. My heart strings were about to cry out their loneliness when "TWANG," they were snapped by an innocent question: "And how did you like the fire truck I sent you, Son?"

"Where? Where?" said Son, rummaging through the wrappings. Where, indeed? On the closet shelf, where I'd put it and forgot it. I dashed into the closet and brought out the box, explaining that Santa had hid it as a joke. Son tore off the wrappings, and there it was—unassembled!

The Air Force goes to the FAIR

by Capt. RICHARD A. ENGLE, USAFR

REMEMBER THE LAST TIME you went to a county fair? Remember the cotton candy, the carousels, the hawkers, the fireworks, the row upon row of displays showing everything from prize hogs to canned peaches?

For the past four years the Air Force has been going to fairs across the country. But they are different from the ones you remember. The carnival atmosphere is missing. There is no cotton candy, hawkers, or carousels. And instead of fireworks, scientific careers are being launched which will soar into reality during the next decade.

The fairs that the Air Force is interested in are called science fairs.

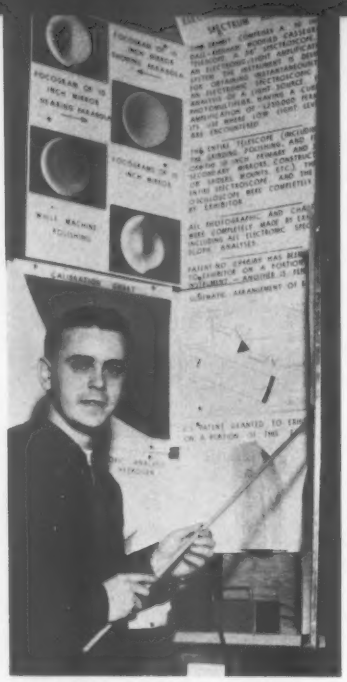
It is universally recognized that the future strength of any society is in the hands of its children. In a modern society such as America's, science and technology are gaining increasingly important roles in the continuation and improvement of national defense and our economic way of life.

As Robert Jastrow, director of the National Aeronautics and Space Agency's Goddard Flight Center, recently said: "Our greatest achievements are still ahead of us and our success will depend on the scientific and engineering talents of our youth."

Little wonder, then, that the Air Force, with its insatiable appetite for scientific technology, should undertake a significant role in encouraging teenage boys and girls to investigate opportunities of the Aerospace Age.

The Air Force first joined a national effort to encourage the training of young men and women in science and related fields in 1958. In that year the Air Force became associated with Science Services, Inc., Washington, D. C., a non-profit organization for the popularization of science. This organization and its affiliated groups annually sponsor state, regional, and national science fairs where our fledgling scientists display an amazing array of scientific projects ranging from a study of common insects to construction of a small atom smasher.

The Air Force's participation in science fairs is an effort to single out and honor those young scientists who create outstanding projects related to its interests. Each winner in an Air Force classification at a state or regional fair receives a certificate of achievement. At the National Science Fair-International, in addition to the certificate, winners receive an engraved plaque, an encyclopedia set, and an invitation to visit a research and development facility of the Air Force Systems Command (AFSC).



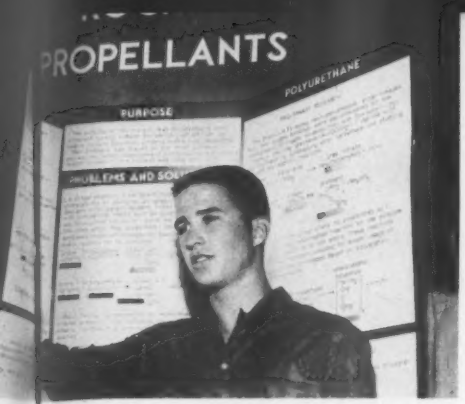
AF Photo and Optic... in addition to award...

That enthusiasm for Air Force awards has greatly increased through the years is evidenced by the increasing number of state and regional fairs cooperating with the program and the number of exhibits applicable to Air Force classifications. During the 1959-60 school year, for example, the Air Force participated in 87 out of 193 state and regional fairs and selected for award five projects at the National Science Fair. This past year, the Air Force participated in 170 out of 204 regional fairs and selected nine national winners and two for honorable mention.

The list of projects which won Air Force awards at the 12th annual National Science Fair-International, held last May in Kansas City, reads more like a list of research projects at one of the Air Force's research centers. And this description is not too far from the truth. Two of the winning projects were in the identical scientific field as two problems presently under study by commercial research firms.

Although it is not practical to give detailed descriptions of each project, it is worth while to summarize at least one.

Robert E. Strom, a 14-year-old mathematical genius already famous from appearances on the now defunct "$64,000 Question" TV quiz show, took top honors in the Electronic Computers category with his project "Symbolic Compiler for Arithmetic and Logical Program." He designed a compiler for a mathematician who desires to communicate with a computer program by means of general mathematical statements and a



Presentation on Solid Rocket Propellants won three awards for Baylor B. Triplett.

Kathryn Kampe, daughter of TSgt. Fred W. Kampe, Jr., of Craig AFB, won a trip to the Army Chemical Center and an honorable mention by Society of American Bacteriologists.

t to Robert E. Fischer
al Society of America.

basic flow chart rather than by means of machine language. Given the problem in flow chart form, Strom's compiler automatically writes and codes a program for the IBM 650 computer. The device was tested by the Watson Scientific Computing Laboratories and was found to be two to ten times faster than existing compilers.

From this brief description, it is easy to recognize the high caliber of the experimental projects. It is also easy to understand why all who become associated with the science fairs are vehement in their praise of the energy and imagination shown by these youngsters. As Col. Earl T. Reichert, Air Force science fair project officer, explains:

"Most people who are asked for the first time to participate in the fairs go through three stages. First they're hesitant, then, after they see some of the exhibits, they are amazed, then completely enthusiastic."

So close was the competition at the 1961 National Science Fair that the judges, all members of the Air Force scientific community, awarded two honorable mention certificates. These experimental projects were titled "Applied Research in Model Aeronautics" and "Design Testing of Re-entry Vehicles from Space to a Two Dimensional Supersonic Wind Tunnel."

The judging team was headed by Brig. Gen. David A. Jones, vice commander of Aeronautical Systems Division (ASD), AFSC.

Brig. Gen. Aullman Culbertson, director of systems management for ASD, presented the Air Force awards to the 1961 finalists. The group was later flown to Wright-Patterson AFB in Dayton, Ohio, for a four-day visit as the guests of Maj. Gen. Waymond A. Davis, commander of ASD. There, they visited the division's 14 laboratories and had an opportunity to discuss their individual interest areas with scientists and engineers.

The nearly 800,000 grade- and high-school students who participate in the science fairs held throughout the country get their project ideas from class discussions, books, magazines, and even television. They then zealously work on their chosen experiments under the guidance of a teacher or other qualified adults in school laboratories or in home workshops.

At the fairs the young scientists, by means of placards, drawings, materials, and other devices, illustrate their projects. It is not enough to build an ingenious gadget, since exhibits must demonstrate scientific thought and creativity. In fact, these two factors carry the heaviest weight on the judges' score cards. Other factors are thoroughness, skill, clarity, and dramatic value. And, of course, each experiment winning Air Force recognition must be related to the Aerospace Age.

Before winning a berth at the National Science Fair-International, which in 1962 will be held in Seattle, Wash., during May, each project is first judged in the state or regional fairs. Only the top two are sent to the national fair—preliminary to the international.

Many of the young scientists participating in the science-fair programs are sons and daughters of Air Force personnel. And several of the finalists at the 1961 National Science Fair were Air Force dependents. One, Joyce Yucker, 17-year-old daughter of Lt. Col. and Mrs. Julius L. Yucker, Jr., stationed at Kirtland AFB, N. Mex., tied for top honors in the fair's physical science division.

It is difficult to estimate the value of science fairs. They have certainly increased interest in science, even to the extent of helping improve science curricula in the schools. As a result of local science fairs, many schools have doubled or tripled their science offerings. Students also show more interest in science as a career. A recent survey among the fair exhibitors reveals that 92 percent of the finalists go on to make science, education, or engineering their careers.

But perhaps the most beneficial result of the science fairs is the impact that they have had on the population as a whole. Businessmen, lawyers, bakers, and lathe operators are beginning to acquire a better understanding of science and its needs. And this is of vital importance because science and technology are so interlaced with our daily lives that our economic welfare as well as our survival as a free people are at stake.

USAF's most recent Medal of Honor recipient was a veteran flier with a long combat record who seemed

DESTINED TO DIE

On March 16, 1942, Charles Joseph Loring, Jr., enlisted as a private in the Reserve forces, and was earmarked for eventual entry into the Aviation Cadet program. On November 22, 1952, Maj. Charles J. Loring, Jr., was killed in action in Korea.

Between these two dates, this Air Force veteran followed a career that was studded with combat highlights and close brushes with what proved to be his ultimate fate: a hero's death while fighting for his country.

His call to active duty came in mid-May 1942, and the nine months that followed were devoted to the concentrated task of pilot training. On February 16, 1943, Loring graduated from flying school at Napier Field, Ala., and was commissioned a second lieutenant.

Six short weeks later, he was on his way to Puerto Rico to join the 22nd Fighter Squadron, 36th Fighter Group, which was serving as part of the defense force for the Caribbean area and the Panama Canal. His destiny was to be tied to this unit for the balance of his WW II combat career.

After three months of patrols and antisubmarine missions in P-39 and P-40 aircraft, Lieutenant Loring returned to the United States with the organization in July. Almost immediately, preparations began for reassignment to the European Theater. During succeeding months, the group completed conversion to P-47-type aircraft and in March 1944 sailed for England.

Assigned to the 9th Air Force, the 36th operated primarily as a fighter-bomber outfit, strafing and dive-bombing targets on the Continent which ran the gamut from armored vehicles and trains through bridges, buildings, and factories to troop concentrations, gun emplacements, and airfields.

Early in August, Lt. Charles Loring had his first brush with death. During a strafing mission, his aircraft was hit by ground fire and he was wounded. However, he managed to guide the crippled plane home. The wound, fortunately, proved to be of a comparatively minor nature, and he soon returned to flying.

Fate was not so kind the second time. On Christmas Eve 1944, the 22nd was charged with a particularly tough strafing mission in support of the drive to clear the enemy from the Belgian Bulge.

Time after time the *Jugs* of the 22nd swept over the German lines, meeting a withering fire, but taking a mounting toll. With the mission nearly complete, Lieutenant Loring's aircraft was hit, and he was forced to

In the Name of Congress

No. 37 IN A SERIES

by SMSgt. HAL BAMFORD

crash land behind the enemy lines.

He was taken prisoner, sent to the German interior for confinement, and for nearly five months was an inmate of German prison camps. On May 6, 1945, advancing Allied armies overran the final camp in which he was confined, and he returned to friendly lines.

Within less than a month, he was on his way home. After the war ended, Lieutenant Loring requested he be allowed to remain on active duty. His outstanding contributions to the war effort and acknowledged leadership won approval for his request.

During the early post-war months, he received a variety of schooling designed to round out his military training. Included were the Army Exchange Service School, the Adjutant General's School, and the Army Information School at Carlisle Barracks, Pa.

At the latter, he distinguished himself to the degree that he was selected as an instructor and served in that capacity for nearly three years.

Late in August 1949, however, Captain Loring was ordered to the Air Tactical School at Tyndall AFB, Fla., in a temporary-duty status. Upon completion of this course, he returned to the Information School and resumed his duties as an instructor.

When the Korean Conflict erupted in June 1950, Captain Loring's desire for combat again surged to the surface and he volunteered for transfer to a combat unit.

For Loring, the months seemed to drag by until February 1952 when his request was honored. The long wait was not completely unfruitful, however, for in the meantime, he was promoted to major. On Decoration Day, he sailed again, this time to join in the aerial fighting that raged over Korea.

Upon his arrival in the Far East, he joined the veteran 8th Fighter-Bomber Wing which had begun its operations in the new theater on June 26, 1950, flying a multitude of missions from Japanese bases.

In October 1950, the unit converted from F-80 to F-51 aircraft and began operating from strips on the Korean peninsula. In December, they were forced to return to Japanese bases when a Communist drive penetrated deeply into South Korea. During their enforced operations from Japan, they reconverted to F-80s and, the following June, they returned to Korea, this time retaining the *Shooting Stars*.

When Loring joined the 8th, in deference to his rank he was assigned to Headquarters and Headquarters Squadron and charged with the training and indoctrination of replacement pilots.

However, on July 3 he joined the Wing's 36th Fighter-Bomber Squadron as a combat pilot. Shortly thereafter, he was appointed Squadron Operations Officer of the 80th Fighter-Bomber Squadron, also a unit of the 8th. Throughout this period, he must have harked back to his European combat days for, except for the type of aircraft, the missions were quite familiar —strafing the enemy's ground power.

It was on such a mission as this that Loring was to go to his death. On the morning of November 22, 1952, Major Loring was assigned as leader of a flight of four F-80s charged with a close support mission over North Korea. The citation which was issued on December 14, 1953, dramatically recounts the story of that last flight.

Maj. Charles J. Loring, Jr., distinguished himself by conspicuous gallantry and intrepidity at the risk of his life above and beyond the call of duty near Sniper Ridge, North Korea, on 22 November 1952. While leading a flight of four F-80 type aircraft on a close support mission, Major Loring was briefed by a controller to dive bomb enemy gun positions which were harassing friendly ground troops. After verifying the location of the target, Major Loring rolled into his dive-bomb run. Throughout the run, extremely accurate ground fire was directed on his aircraft. Disregarding the accuracy and intensity of the ground fire, Major Loring aggressively continued to press the attack until his aircraft was hit. At approximately 4,000 feet, he deliberately altered his course and aimed his diving aircraft at active gun emplacements concentrated on a ridge northwest of the briefed target. With conspicuous gallantry and daring, Major Loring turned his aircraft 45 degrees to the left, pulled up in a deliberate, controlled maneuver, and elected to sacrifice his life by diving his aircraft directly into the midst of the enemy emplacements. His selfless and heroic action completely destroyed the enemy gun emplacement and eliminated a dangerous threat to United Nations ground forces. Major Loring's noble spirit, superlative courage and conspicuous self-sacrifice in inflicting maximum damage on the enemy exemplified valor of the highest degree and his actions were in keeping with the finest traditions of the United States Air Force.

Loring's Medal of Honor, the most recent awarded to a member of the United States Air Force, was the 47th to be bestowed upon a USAFman.

In addition to this nation's highest decoration, Maj. Charles Joseph Loring, Jr., also received the Distinguished Flying Cross, the Air Medal with 11 Oak Leaf clusters, and the Purple Heart with one cluster.

Today, Loring AFB, in the major's native state of Maine, stands as a living tribute to one of this nation's distinguished few.

MATS goes modern

Getting there first with the most is MATS' job.

IN 1934 a young Army pilot reported to Boeing Aircraft Plant, Seattle, Wash., and took delivery of a brand-new plane for the Army Air Corps. The small P-26 biplane fighter was considered pretty hot although it flew at less than 200 miles an hour. Twenty-seven years later, in June this year, at the same site, the same officer accepted another plane.

Things were different this time. The young man was now a senior Air Force officer and the plane was a large jet capable of flying more than 500 miles per hour. Lt. Gen. Joe W. Kelly, commander of the Military Air Transport Service, was marking the entrance of MATS' strategic airlift force into the jet age.

A lot has happened since 1934. Airpower has matured. The U. S. has forces everywhere and is committed to help defend dozens of Free World allies. General Kelly now heads a military airlift force which America relies on to move anything, anywhere, anytime to support national policy. Primary mission is swift movement of troops and materiel for the Department of Defense.

The fast jet accepted by General Kelly for MATS is the Boeing C-135 *Stratolifter*, the Air Force's first pure jet cargo transport. MATS will get 30 of these far-ranging aircraft which were adapted from the KC-135 "flying gas station" used as an aerial refueler by the Strategic Air Command.

Cross-country Flight

General Kelly, after accepting the aircraft at Boeing Aircraft Plant, flew with it to McGuire AFB, N. J., in 4.5 hours. There a flight-line audience heard the Hon. L. Mendel Rivers, Chairman of the House Armed Services Subcommittee on Military Airlift, express his determination to insure that MATS grows ever more fit to do its job. Lt. Gen. Thomas Trapnell, USA, commander of the Strategic Army Corps, pointed up the C-135's importance in swiftly airlifting ground strike forces to combat areas. Maj. Gen. William P. Fisher, USAF, accepted the plane for Eastern Transport Air Force.

In turning over the aircraft to EASTAF officials, General Kelly said, "Production of the C-135 for MATS represents only the first step in a long-range airlift modernization program that will encompass: (1) Two squadrons (30 aircraft) of *Stratolifters* by August 1962, one to be stationed here at EASTAF, McGuire AFB, the other to be at Travis AFB in California, the home of the MATS Western Transport Air Force, and (2) Fifty Lockheed C-130E turboprop cargo and troop aircraft by March 1963, and (3) more than 100 turbofan-powered Lockheed C-141s, specially designed for the military airlift mission, with delivery expected to begin in Fiscal 1964."

This latter aircraft will be an "uncompromised" tail-

Commander of the nation's strategic airlift force, Lt. Gen. Joe W. Kelly sits at controls of the first C-135 delivered to MATS.

loading big cargo jet. It is being specially designed for the job MATS has to do and will eventually become the backbone of the airlift force.

In the meantime, however, the C-135 will beef up global mobility through a combination of high-speed (530 m.p.h.) range and payload (4,000 miles with about a 15-ton payload).

Limited by its configuration in the sizes and shapes of cargo it can carry, the C-135 is only an interim step between the old-and-slow and hot-to-go. Nevertheless, MATS is retraining more than 1,600 people for the *Stratolifter*. These include 200 pilots and 125 navigators. Since the aircraft is adapted from a SAC plane, SAC training units were called upon to lend a hand.

On March 3 this year, 12 MATSmen sat down in Class 61-10 of SAC's Combat Crew Training School at Castle AFB, Calif. There they underwent instruction at the hands of members of the 4017th Combat Crew Training Squadron.

Academic training covered 112 hours for pilots, 123 for navigators, and 119 for flight engineers, of whom there were four each in the first class, all eager.

"We're in on the ground floor of a brand-new program," says Maj. Forrest E. Ott, of McGuire AFB. He was halfway through his transition training when interviewed. Capt. Veryl Coulter, taking KC-135 simulator and jet instrument training with Major Ott, was also excited about being one of the early entries. "With the C-135 we can fly anywhere in EASTAF's area with just one crew," he added. The two were making a "canned" departure in the simulator, out of Walker AFB, N. Mex., where some of the MATSmen get flight training after completion of academic and synthetic trainer phases at Castle. The rest get all of their training, including flight, at the California base.

Builds Confidence

The MATSmen were greatly impressed by the faith SACmen had in the KC-135. Boeing officials, in announcing delivery of the C-135, said that its predecessor, the KC-135, together with the commercial 707 and 720, had logged more than one million flying hours, marked by a number of records. On April 8, 1958, a KC-135 flew non-stop from Tokyo to the Azores, a distance of 10,228 miles, without refueling, in 18 hours 47 minutes. All four aircraft are descendants of the venerable "Dash Eighty," their brown-and-yellow jet grandfather, which was parked near the C-135 delivered to General Kelly at Boeing Field on June 8.

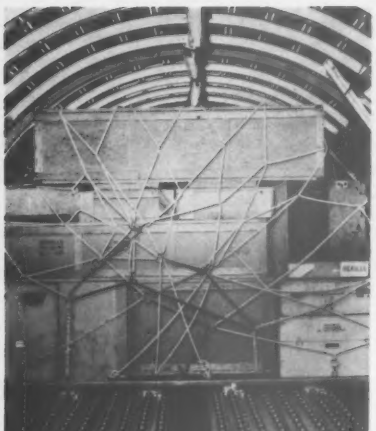
The Dash Eighty is cited by Boeing as the world's most-tested aircraft. From it were developed the 707, 720, and KC-135 and from the SAC aerial refueling plane the first jet cargo transport for MATS.

Austere is the word for MATS' new aircraft. Soundproofing is not nearly so complete as in the plush commercial 707 and 720, and two rows of bucket seats run along its interior. Between these will be installed the 463L cargo loading system, developed under sponsorship of the Air Force by commercial contractors.

The loading system consists basically of a ball-bearing pallet transfer plate opposite the side door, a specially designed pallet, and lines of roller bearings, running aft from the door. The floor is metal, to withstand wear, and carries two tracks located outside of

After more than 100 trans-Atlantic round trips in piston-type planes, MATS Capt. Eugene T. Morrow has switched to the new C-135 jet. He will help train other pilots of the command in the Stratolifter.

In Boeing assembly plant a new C-135 nears completion in background. Sections in foreground are for KC-135.



Special pallet transfer plate, developed under AF sponsorship, is a feature of the cargo loading system for the C-135. Pallets are rolled along special tracks equipped with steel roller bearings.

the roller-bearing lines. Along each track are fitted pallet locks, and tie-down fittings. Here's how they all work.

A prepared pallet of cargo weighing up to four tons, measuring 88 by 108 inches and nearly six feet high, is lifted into the cargo opening, coming to rest on the ball-bearing transfer plate. It is then pushed aft, manually, over the roller bearings, a task so easy a reporter was able to move a pallet with one hand so the photographer could get a better picture. When in proper position, track locks are flipped into place, and double security given by lashing the cargo to tie-down fittings. Up to nine pallets can be accommodated, and loading or unloading can be accomplished in 25 minutes. Unloading and reloading previously prepared pallets can be done in 45 minutes.

The C-135 also has facilities for troop lift or medical evacuation. Fittings in the floor allow seats or litters to be snapped in place quickly. Thus the C-135 can move considerably more than 100 combat troops where needed, or evacuate 44 litter and 54 ambulatory patients.

Reduces Flight Time

MATSmen will be able to perform these jobs more rapidly than ever before. Flight time on all routes will be cut radically. The jump from McGuire to Rhein-Main, for instance, averages out at more than 15 hours for C-118s and C-124s. The C-135 will cover those 3,230 nautical miles in 7.5 hours, carrying a 15-ton payload. It can haul the same load from Travis to Hickam in slightly more than 5.5 hours. These new times and loads mean a lot to the men who will man the C-135.

Turnaround time will be shorter and maintenance time radically reduced. MSgt. Michael Sapp, flight engineer during the first C-135 flight, and one of the first four enlisted men to complete transition training with SAC at Castle AFB, pointed out ignition system advantages. Sapp, who's logged nearly 9,000 hours in just about every two- and four-engined piston type the Air Force has flown since 1943, pointed up differences between the C-124 and C-135 systems. "This plane," he said, referring to MATS' new jet, "uses two fuel igniters in each engine, whereas the C-124 has fifty-six spark plugs per engine." Sergeant Sapp pointed out the big difference in maintenance work. The C-135 fuel control system can be replaced in a few minutes.

Sapp, under whom MATS flight engineers will train for three months in qualifying for the C-135, is really sold on the *Stratolifter* and will sell you if given half a chance. "Oil's another thing," he said during the flight from Seattle to McGuire. "This plane requires only 169 pounds of oil, compared with 2,400 pounds for some other types of aircraft. That gives you an extra ton of payload right there."

Maj. Ernest E. Campbell, formerly of Strategic Air Command, piloted the C-135's first military flight June 9. Now with MATS at McGuire, he'll assist in the transition program, together with other pilots, navigators, and flight engineers trained by SACmen at Castle and Walker AFBs. By the end of 1962 two squadrons of the new jets, totaling 30 aircraft, will be flying MATS routes, one squadron each at Travis and McGuire.

It will be 1964 before the Lockheed C-141 is delivered. This tail-loading, uncompromised jet is considered the ultimate for MATS' purpose to date. More than 100 of the C-141s will eventually move into the strategic airlift force, and MATS will then be able to keep pace with other aircraft of the jet age. In the meantime, the C-135 *Stratolifter* will be MATS' pioneer jet over global routes ranging from Tokyo to Tripoli, helping to lace Free World defenses tighter together.

LETTERS TO THE EDITOR, continued

CAP Comments

Sir: As a fan of the United States Air Force and a Cadet in the Civil Air Patrol, I have read and enjoyed many fine issues of THE AIRMAN. However, I was particularly delighted on reading your excellent article on the CAP in the July issue. On behalf of the Cadets and the senior members on the Mobile Composite Squadron, I wish to express our thanks. Keep up the fine work.

Cadet Lillian Fagerstrom
Mobile, Ala.

Sir: My son and I read your excellent article on the Civil Air Patrol with great interest. My son is most interested in the CAP Cadet program. Could you send me the mailing address of their national headquarters so that we can make further inquiry? Also, I should like to express my congratulations on your excellent magazine.

Ernest Schneider
Plattsburgh, N. Y.

● *Information on the CAP is available through the Information Officer, Civil Air Patrol Headquarters, Ellington AFB, Tex.*

★ ★ ★

About Kincheloe

Sir: In the article *The X Marks the Way* in the July issue, CMSgt. Edison T. Blair states that Capt. Iven Kincheloe's F-104 flamed out causing his death a few days after that of Captain Apt. I think that it was actually almost two years later that Kincheloe died. Am I correct?

A1C Garland Crosby
Andrews AFB, D. C.

● *Airman Crosby is quite correct. Sergeant Blair erred in his notes and the mistake was not discovered until after we had gone to press.*

★ ★ ★

Korean Comments

Sir: I have just completed the article *Glimpses of Life on the Korean Frontier* which appeared in the July issue. Lieutenant Shershun states that outside of Kunsan AB and Osan AB, all airmen in Korea are at isolated sites or with Air Force Advisory Groups. Apparently he has never heard of Kimpo AB. Only 17 miles from Seoul, it hosts Kimpo International Airport and is the entry and departure point for most U. S. military and civilian personnel arriving in or departing from Korea. We, at Kimpo, feel that we are a vital part of USAF forces in this nation.

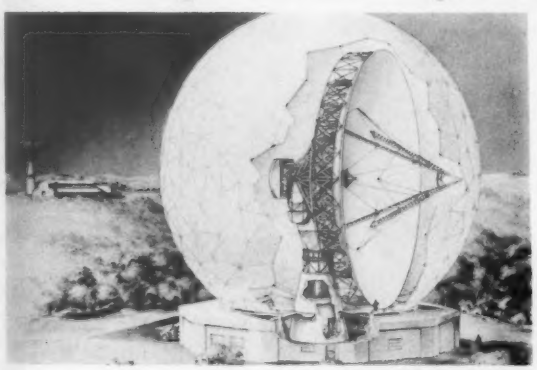
A1C Albert Bateshansky
APO 76, San Francisco, Calif.

● *Lieutenant Shershun stated in his article that "most" U. S. airmen are assigned to Osan or Kunsan AB during Korean duty. Then he adds, "many others" work with advisory groups or at isolated sites. Obviously, this leaves a small number which is assigned elsewhere in Korea. Part of this number is stationed at Kimpo AB. However, it is impossible in a story of this nature to mention all bases in any area without simply attaching a list to the story. Our apologies to those based at Kimpo. We hope this compensates.*

Sir: The July issue of THE AIRMAN brought back many pleasant memories. I was stationed at ZX Homer for about 10 months during 1958-59. There were only three of us at this site, but it was the best tour I have ever had and I made many Korean friends during my stay. We even conducted our own Armed Forces Day, and understanding between us three and the Koreans was at a high level. I would like to make one correction, however. We lived in a Nissen hut, not a farmhouse.

Howard H. Ragan
APO 243, New York, N. Y.

It's a Trapezoidalhexagonohedron *it really is.*



On the peak of Haystack Hill in Tyngsboro, Mass., construction of a radio research facility is proceeding on schedule. All you will be able to see from the outside will be the steel and concrete base, and the trapezoidalhexagonohedron. That's the dome.

Employing a 120-foot-wide saucer-shaped antenna with a surface contour of unprecedented accuracy, the unique radio research facility is being built for global communications and space studies. Managed by the Electronic Systems Division at Hanscom Field, it is scheduled to be "on the air" by the end of 1962.

MIT's Lincoln Laboratory is playing a major role in the design and construction, and will operate and evaluate the facility for the Air Force when it is completed.

Haystack Hill is only a short distance from Lincoln Laboratory's famed Millstone Hill radar in Westford, forerunner of today's high-power long-range radars, and one of the Free World's prime sources of satellite tracking information.

The extremely precise antenna will be completely sheltered from New England's temperamental weather by the trapezoidalhexagonohedron which is to be 150 feet across its widest part, 134 feet high, and 90 feet across at its base.

Without the protection of the fiberglass and aluminum framed dome, wind pressure and the sun's heat on the antenna's quarter-acre reflector surface would distort it beyond the allowable limit of .075 inch.

Containing more than a million and a half cubic feet of space, the radome is designed to withstand winds up to 130 miles an hour. It is composed of 930 triangles connected in a carefully planned "random geometry" pattern so it will not interfere with the radio beam. The Air Force designates the radome as the CW-142/FPS (XD-1) which is only slightly better than trapezoidalhexagonohedron.

SUITED FOR SPACE

by 1st Lt. RICHARD B. PILMER
Edwards AFB

It gets hot in the Mojave Desert, especially on the Edwards AFB flight line which sprawls alongside a dry lake bed. In the summer of 1958 a pilot named Dick Willis donned a full-pressure suit to pose for a documentary film being shot on the sizzling concrete ramp. The suit was an early model of the MC-2, later used by the X-15 pilots.

Willis sweltered in and out of cockpits for an hour. When he peeled the suit off and turned the bottom half upside down to dry, a pool of perspiration spilled onto the hangar floor. The scales announced he had lost seven pounds!

It takes five or six hours to preflight and check out a research plane like the X-15. For a pilot a full-pressure suit is essential but the suit heat build-up before the pilot gets into the air-conditioned cockpit could weaken him dangerously. So the 16th Physiological Training Flight—now the Environmental Section—built a mobile, electrically independent, air-conditioned dressing room in a 30-by-9 foot semi-trailer photographic van.

Pressure Breathing

Man can't live without an artificial earth environment above 45,000 feet where the X-15 begins its powered flight and at X-15 altitudes of up to 100 miles he would literally explode without a functioning pressure suit if cockpit pressurization should fail. Therefore, the pilot wears his earth environment inside his pressure suit. The X-15 is mostly a flying fuel tank, a rocket bomb with its inherent fire hazards—with the pilot on top. That is why both the cockpit and suit are pressurized with nitrogen, an inert gas that will not burn.

Only the helmet, separated from the remainder of the MC-2 suit by a snug-fitting rubber neck seal, contains oxygen. The pure oxygen pressure in the helmet is kept slightly greater than the nitrogen pressure in the bottom portion of the suit so the two gases cannot mix in the helmet. It is also necessary for proper "pressure breathing."

Donning a full-pressure suit is not simple. The three-layered MC-2 suit consists of a ventilation garment; upper and lower rubber garments that fold together at the waist to form an air-tight seal. Over this goes a two piece, finely woven restraint nylon one-way-stretch garment that prevents the ventilation garment from ballooning when inflated with the cooling and pressurizing nitrogen. An aluminumized reflective garment is worn outside. The outer suit protects the pilot from reentry aerodynamic heat, radiation, and hypersonic wind blast should he eject.

A small hand-carried liquid oxygen unit keeps him cool until he is connected with plane's ventilation system.

Medical Monitoring

Inside a heat chamber, the MC-2 suit will protect a man from wall temperatures up to 270 degrees F. and from chamber temperatures of 180 degrees for 2.5 hours when ventilated.

The whole suit was also designed to permit in-flight medical monitoring. Instrumentation of the pilot's body is the first step in dressing him. Lt. Col. Burt Rowen, chief of the Bioastronautics Branch, supervises the attaching of tiny pick-up electrodes to the pilot's skin. These miniature transducers and sensors convert physiological responses such as heartbeat, temperature changes, and respiration rates into electrical impulses. The impulses are telemetered to ground receivers for immediate interpretation and permanent recording. The records are used in correlating, plotting, and evaluating reactions; data which are invaluable for future flights where severe physical stresses may occur.

The 20 airmen and civilian experts in the Environmental Section began developmental testing of the MC-2 in 1958. Since then, they have tested it in more than 100 T-33, F-102, and low-pressure chamber flights, which produce pressure altitudes up to 200,000 feet. On one "flight" a tiny bubble of air trapped beneath a linoleum tile expanded until it popped the tile loose on the floor. These people have practically all the existing experience and skill needed to maintain and support this essential piece of personal equipment, as the X-15 pilots will attest. They wore the suit on the first 62 record-setting flights of the high-speed, high-altitude research craft.

Checkout in Pressure Chamber

The research pilot usually uses the pressure chamber to make sure his suit is working safely. A few days before he is scheduled to fly the bird, he dons the suit just as if he were going to fly and runs it through a console check of all the valves and circulation systems. The Environmental people help him.

During the chamber test particular attention is given to the suit and helmet differential pressures at various altitudes. If the suit nitrogen pressure should overcome the helmet pressure he might find himself breathing nitrogen instead of pure oxygen. This would knock him out in less than ten seconds, despite the fact that the atmosphere we earthlings breathe contains 80 percent nitrogen and only 20 percent oxygen.

Leak Detection

Maj. Ralph N. Richardson, Chief of the Environmental Section, and Norm Foster, technical representative from the suit manufacturer, have directed development of several instruments to help detect leaks and adjust malfunctions of the delicate sensors and regulators. Among these are a helmet test stand and a miniaturized low-pressure chamber that permits checking of the controller unit operation without running a fully manned test in the big chamber.

When the pilot is satisfied with the chamber check, his suit and accessories are stored in the dressing van until flight time. The van is hauled to the mating area by a five-ton tractor unit and then down beside the dry lake bed to meet the returning pilot when the X-15 skids to its landing.

The van has indirect lighting, reclining leather chairs, clothes locker, hot coffee, and cool drinks—everything

needed to be comfortable while dressing, undressing, or just waiting to board the aircraft. There is a workbench where minor last minute repairs and adjustments can be made. The power system can be plugged into an external source or use the van's self-contained generator. A radio transmitter and receiver tuned to the test flight control frequency keeps the pilot informed of preflight progress. It also makes him available for consultation or comment.

A built-in check console permits a complete oxygen, ventilation, pressurization, anti-G, voice communications, and a biomedical systems continuity check before the pilot walks the 60 feet to his airplane. But the Environmental Section goes even farther. They furnish him with a small hand-carried liquid oxygen unit that keeps him cool while walking to the plane and until he is connected to the plane's ventilation system.

During the taxi, takeoff, and landing phase of his flight, a rescue team from the organization hovers nearby in a helicopter. MSgt. Jerry Klassen, TSgt. Tom Corne, and A1C Dixie Rinehart all know the intricate ins and outs of the pressure suit. They are ready to help the pilot out of his plane and suit in any emergency.

Survival Studies

Besides building the dressing van, the unit has conducted cold water tests, flotation and survival studies, made heated visor tests, developed an emergency oxygen system for the X-15, and an anti-suffocation valve for the full-pressure helmet. They have also aide various contractors who initiated a modification an maintenance program that produced the more advance A/P 22S-2 suit that saved Maj. Bob White's life wh the cockpit lost pressure last June. Meanwhile th Bioastronautics personnel have kept their skills abrea through formal training and practical experience.

Features of New Suit

The A/P suit is easier to don because the vent ga ment, gas bags, and restraint layers are combined. It essentially a one-layered garment with a single zipp entry. Another advantage of the A/P suit, which ha been worn on all X-15 flights since last March, is tha the seal between the helmet oxygen and suit nitroge is around the face instead of the neck. Not only is it more comfortable and less restrictive for the pilot, bu he can adjust the seal himself with a knob on th helmet. The new helmet has a breathing regulator tha eliminates pressure sensing lines that could lead to technical problems. In the earlier suit the regulator wa in the back controller unit, a metal rack in the back o the suit that held both the controls and the bailou oxygen bottles.

The anti-suffocation valve and the heated visor em phasize the complexity and precision of the helmet The visor is literally gold-plated but the gold coating is only *one molecule thick*. Supplied with low voltage electricity this gold coating is a transparent heatin element that prevents the visor from fogging or frostin over.

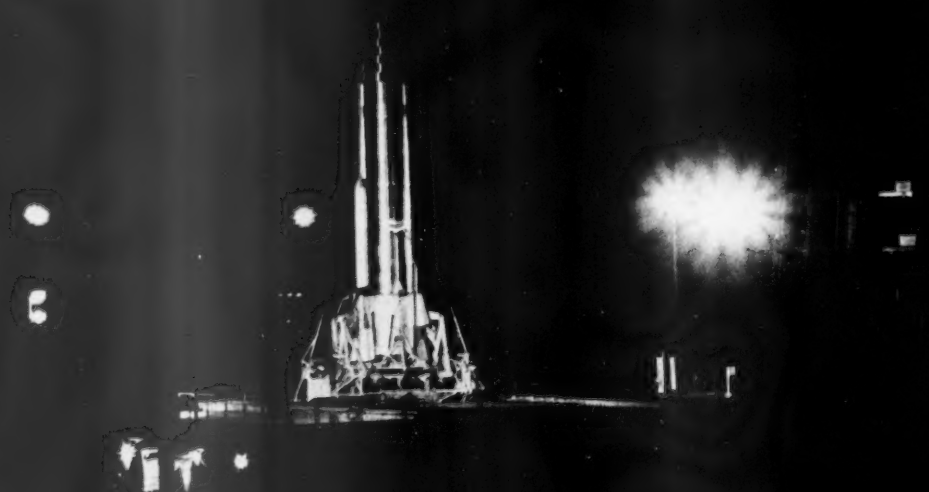
The anti-suffocation valve is sensitively adjusted so that the helmet remains sealed for 1.5 minutes after the oxygen supply is depleted. This allows the pilot time to cut in his 20-minute emergency supply of oxygen. If he should eject and make a parachute descent, the valve would still open 1.5 minutes after the bailou bottles were emptied. With the helmet open he could then breathe normally even though he should be injured in the descent.

Such personal equipment is going to become more complex as pressure suits and space suits evolve. The B-70, *Dyna-Soar,* and still-to-be-designed space craft will require an artificial life environment. A full-body radiation counter is almost certain to be added to the biomedical package of newer suits. A man, properly supported and furnished certain information of his machine's performance, will long be an essential part of our aerospace activities. It is obvious that the man must rely heavily on the experience, skill, and quality maintenance of men in this and other Environmental Sections who provide the life environment. The Bioastronautics people will ensure the life environment.

The pilot must rely heavily on the skill, experience and quality maintenance provided by men supporting him.

AIRMAN'S WORLD

Two successful, sub-orbital *Project Mercury* shots have been accomplished. Consequently, NASA officials are now preparing for the next step into space — man-in-orbit. The booster for this mission will be an *Atlas* ICBM such as pictured in this striking night photo by SMSgt. William Lummus. Currently operational within SAC, the gleaming giant is one of America's most effective deterrent weapons as well as one of its most versatile satellite boosters.



MEMBERS OF USAF'S 47th Bomb Wing are increasing understanding between RAF Station Sculthorpe airmen and their British neighbors. As part of a concentrated campaign, the airmen are conducting a "course" in U. S. customs, geography, industry, and similar subjects, for youngsters at the Earlham Secondary Modern School at nearby Norwich, England. Here MSgt. Matthew Barcelona lectures on his home state of Louisiana.

Game of Chance

TSgt. Thomas J. King, taking a cue from nearby game-of-chance resorts, has developed a novel ground safety reminder for personnel at Fallon AS, Nev.

The gimmick is a slot machine. However, unlike its commercial counterparts, this one operates without benefit of coins. Instead of the normal pictures of fruit on the reels, King's machine displays statistics — accidental deaths, manhours lost, and days without accident—for his 858th AC&W Sq.

Sergeant King feels the jackpot outpays any coin-of-the-realm machine ever devised. Conceivably, he believes, it could be responsible for the biggest payoff of all—the saving of a life.

Testing

Final 1961 cycle of Phase I Specialty Knowledge Testing will be conducted during the first two weeks of October in 21 active-duty career fields.

Overseas assignees will have tests made available to them during the period October 2 through 7. Stateside assignees may take the same tests between October 9 and 14. Air National Guard and Air Force Reserve personnel will be allowed to take the tests any time during the current calendar month.

Those career fields affected include 22 (Photomapping), 23 (Photographic), 25 (Weather), 30 (Radio-Radar Systems), 32 (Armament Systems Maintenance and Gunner), 34 (Training Devices), 40 (Intricate Equipment Maintenance), 53 (Metalworking), 55 (Construction), 57 (Fire Protection), 58 (Fabric, Leather and Rubber), and 59 (Marine).

Also 65 (Procurement), 67 (Accounting and Finance and Auditing), 68 (Statistical, Analysis, Data Processing and Programming), 70 (Administration), 72 (Information), 74 (Special Services), 75 (Education and Training), 77 (Air Police), and 92 (Aircrew Protection).

Towing Invention

A pair of 36th Tactical Fighter Wing mechanics have devised and built a braking device for towed F-105s which may result both in major savings, and the prevention of serious accidents.

Prior to delivery of the Republic *Thunderchiefs* to Bitburg AB, Germany, mechanics there attended mobile training detachment classes for familiarization with their new aircraft. Among the precautionary notations was the fact that the F-105 was without brakes when the engine was inoperative.

Inevitable discussion greeted this piece of news—and started the usually ingenious GI mind to spinning. TSgt. G. J. Verdi and SSgt. Andy Moore finally hit upon a solution.

Using available parts, the two concocted a small, boxed unit which sets on the tow bar and is attached directly to the aircraft's hydraulic reservoir. Powered by an electric motor and regular aircraft battery, the unit supplies between 2,600 and 3,000 p.s.i. pressure at all times during towing operations.

The suggestion is being considered by the Military Incentive Awards Committee and may be adopted by other USAF F-105 units.

Native Son

"Service brats" are a relatively common specie, but a "native-son-service-brat" is a comparative rarity.

Officials at Webb AFB, Tex., however, recently added the name of A3C Charles Sowell to their rosters and found themselves with a healthy specimen of this rare classification.

Airman Sowell, the son of recently retired MSgt. Charles C. Sowell, lists his place of birth as Big Spring Army Air Base, the name which identified Webb 18 years ago. At the time, his father was assigned to the Army Bombardier School there.

The younger Sowell is currently a member of the 331st Fighter-Interceptor Squadron. Naturally, he visited the hospital upon arrival and was given an escorted tour by staff members. "It's a lot different than the place dad described to me" was his sole comment.

New Wheels

The Goodyear Tire and Rubber Co. has announced development of a new "shatter-proof" wheel for USAF's B-58 *Hustler* bombers.

Designed to prevent fires or other damage in the event of a tire failure during landings or takeoffs, the wheels have proven extremely successful throughout a grueling test program. As a result, Convair, builder of the high-speed bomber, has ordered nearly $500,000 worth of the new equipment for installation on current production models.

Dubbed the "non-frangible wheel," it utilizes a one-inch solid aluminum belt around the center flange. In the event of a tire failure, this belt serves to prevent the aircraft from settling onto the outer wheel rims which would shatter from this added pressure.

During tests conducted at Edwards AFB, Calif., spikes were fired into tires while the plane rolled at full takeoff power. It was successfully halted within 10,000 feet at speeds near 260 m.p.h. Similar tests also proved that such wheels afforded pilots complete control through more than 13,000 feet of landing roll.

UNIFICATION WAS DEMONSTRATED in a most emphatic fashion in Paris recently. The recipient of the joint action was the Navy's Comdr. Richard P. Pawson. The subject was presentation of the Army's Commendation Medal. Presenting the award was USAF's Maj. Gen. C. J. Bondley, Jr., Commander Pawson's division chief. The medal was awarded in recognition of the commander's contributions to the success of USEUCOM's Procurement Branch and for his unusual interest in and contribution to community and youth programs during his assignment. Mrs. Pawson was a proud witness at the ceremony.

Last Call

All entries in the annual Freedom's Foundation letter contest must be in the hands of the judges no later than November 1.

Subject for the current writing program is "What I Can Do For Freedom." Entries must contain a minimum of 100 words and must not exceed 500. Letters should be submitted to the Freedom's Foundation, Valley Forge, Pa. Prize winners will be announced in February.

FIRST OF THREE F-104J *Super Starfighters*, built by Lockheed for the Japan Air Self-Defense Force, streaks from the runway during a California test hop. In all, the JASDF will receive 180 of the 1,500-m.p.h. all-weather interceptors as well as 20 F-104DJ two-place versions for pilot checkout. Mitsubishi Heavy Industries, under contract from Lockheed, will produce 177 of the "J's" at their plant in Japan. Manufacturers in Germany, Canada, the Netherlands, Belgium, and Italy are also producing 104's under similar arrangements.

Historical Notes

October has been a major month in Air Force combat annals.

During WW I, for example, October 9, 1918, marked establishment of a new record in concentration of U. S. airpower. As a part of the Meuse-Argonne offensive, beginning of the end on the Western Front, 250 bombers, covered by 100 fighters, unloaded a total of 32 tons of bombs on enemy targets.

Figures such as these were, of course, dwarfed during WW II. And again October played a major role in American bombardment efforts. One of the best known of all raids occurred on October 14, 1943, when 228 B-17s of the 8th Air Force mounted a major assault against Schweinfurt, Germany.

Ball-bearing plants of that city were hit with more than 450 tons of high explosives and incendiaries. U. S. losses were heavy—62 bombers and 559 airmen. Additionally, more than 40 other wounded airmen were aboard 138 damaged *Fortresses* which staggered home from the trip.

Missiles and Rockets

Increased interest in rocketry, as a result of USAF's expanding missile program, has been recognized by USAF Headquarters. Consequently, official encouragement was recently extended to the formation of model-rocket clubs and societies under Special Services supervision.

Officials warn, however, that model rocketry should be interpreted as limited in scope. Primarily, it is concerned with small, light, inexpensive types made of paper, balsa, plastic, or other non-metallic materials and powered by commercially available motors.

Unsupervised experimental rocketry can be a dangerous undertaking. Building and firing large metallic rockets, powered by homemade fuels and rocket motors, must necessarily be restricted. Professional supervision, extensive safety precautions, and large tracts of land are necessities for such undertakings.

USAF officials feel that officially sanctioned supervision will tend to discourage dangerous practices in amateur rocketry, and help prevent accidents. At the same time, such sanction will encourage and develop skills useful in Air Force operations.

Establishment of model-rocket competition is currently being considered for addition to the Air Force-wide Special Services program.

Bits of Blue

. . . Passenger service between Charleston, S. C., and Rhein/Main AB, Germany, was inaugurated the first of the current month. Traffic originating and terminating in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana will flow through this new channel, thus reducing the load on the McGuire-Rhein/Main flight schedule.

. . . American Rocket Society's 1961 "Space Flight Report to the Nation" will be made during the week of October 9-15 at the New York Coliseum. A committee of 38 experts, chaired by Wernher von Braun, will make the report. USAF will be represented by Gen. Bernard Schriever, Maj. Gen. Don Ostrander, and Col. John Stapp.

. . . SAC's 4136th Strategic Wing recently became the second unit to be equipped with the new B-52H. Based at Minot AFB, N. Dak., the unit christened their initial aircraft the "Peace Persuader."

. . . First of 20 noise suppressors, designed for use with USAF fighter aircraft throughout the world, are scheduled for delivery this month by the Kittell-Lacy Co.

CENTERED IN AN OUTDOOR TEST STAND, a scimitar antenna of the type used on B-52 bombers is given a final check by Boeing engineers before installation. These test stands are capable of creating frequencies up to 75 billion cycles to assure proper performance of such equipment when it becomes an integral part of the communications, navigation, and countermeasures systems of the world-spanning *Superfortresses*.

Air Age Library

HISTORY

USAF Maj. Gene Gurney's *Journey of the Giants* is a recent Coward-McCann release ($4.95). It relates the fascinating history of the B-29 program from its inception to the final A-bomb missions over Japan. Gurney utilizes a wealth of anecdotes, told by the *Superfort* men themselves, to illustrate his tale.

Combat Cameraman (Chilton, $3.95) is a true adventure story of USAF's Sgt. Jerry Joswick as told to Lawrence Keating. It describes his WW II activities, both on the battlefield and in the air over Germany.

One of the great air battles of WW II is the subject of *Strike From the Sky*, Alexander McKee (Little, Brown, $4.75). McKee witnessed much of the Battle of Britain and has told his story from the combat pilot's point of view.

The Saga of Flight (John Day, $5.95) is an anthology compiled by Neville Duke and Edward Lanchbery, which includes contributions ranging from Benjamin Franklin to Chuck Yaeger and Pete Everest.

Alvin Moscow's *Tiger on a Leash* (Putnam, $4.50) is a minute-by-minute account of the tragic Rikers Island crash of Flight 823 in which 20 persons lost their lives.

PROFESSIONAL READING

Thunderbirds!, by Martin Caidin (E. P. Dutton, $4.00), relates the story of this famed USAF aerial demonstration team. Caidin rode with the team to better capture the feel of their performance.

The Stackpole Co. has released their latest revision of *The Airman's Guide* ($3.50).

From the same organization comes a revised directory of *Air Force Bases* ($3.75).

Air Force Combat Units of World War II, edited by Dr. Maurer Maurer, is currently available from the Government Printing Office ($2.50). It comprises an historical encyclopedia of USAF combat groups active during WW II, but not confined solely to that period. A useful reference work for any Air Force member.

FICTION

Jet Tanker, Lt. Col. Grover Heiman (Holt, Rinehart and Winston, $3.95), is a factually accurate, fictionalized treatment of the gruelling tasks which are part of the daily life of SAC's combat-ready crews.

You Ask It

My WW II service record is inaccurate and this is preventing me from obtaining VA benefits. How can I get my records corrected?

The general deadline to apply for such corrections is the 26th of this month. Application must be made on DD Form 149, which can be obtained at any VA office. I suggest you do so immediately.

Are all regional VA offices located in State capitals?

No. Usually they are located in the states' major cities.

Could you explain what is meant by the phrase "presumptive period" as used in VA terminology?

When a wartime or Korean-conflict veteran develops a chronic disease to a degree of 10 percent or more within a year after separation or discharge, it may be presumed to be service-connected for compensation purposes. In the case of tuberculosis, multiple sclerosis or leprosy, the law provides for a three-year presumptive period.

I am about to retire from active duty. Is it possible to reserve a gravesite in a national cemetery?

No. Such gravesites may not be reserved.

I have heard that burial allowances may be paid by the Veterans Administration. Is this true?

The VA is authorized to pay up to $250 toward the burial of eligible veterans. Claims, however, must be filed within two years after burial or cremation.

Who should receive the burial flag used to drape a casket at funeral services?

Usually, the American flag so used is given to the next of kin. However, a close friend or associate may receive it if a relative does not claim it.

My veteran husband died recently. We had been married more than once, the last time just prior to his death. Will the time of our previous marriage count toward the required five years for pension eligibility?

The date of the first marriage is normally used in computing such eligibility. However, you should check with your nearest VA office for specific information.

Because of the amount of my income, I am not entitled to a VA pension. However, I have two minor children by my deceased veteran husband. Do they qualify?

Yes. Minor children qualify even though the mother does not.

How many women veterans are there from WW II?

VA rolls show approximately 319,000.

What is Japan like? What kind of people are the Japanese? Tourist guides paint a strong image of cherry blossoms and geishas, but to those who have lived there, Japan is a . . .

LAND OF MANY FACES

by 1st Lt. CARROLL SHERSHUN, Airman Staff

ALMOST EVERYTHING we have ever read about Japan is absolutely true—and completely wrong.

Think I'm kidding?

Ask any three airmen who have been stationed there. Odds are they'll give you the impression that each was in a different country.

After three often bewildering, but always interesting, years in Nippon I've reached one real conclusion—contradictions and Japan are synonymous. When it comes to describing Japan and the Japanese, I'm more confused than ever.

Oh, I've reached some very definite opinions.

The kimono is the most charming and graceful attire ever worn by woman.

Kobe beef, sukiyaki, and tempura are delicious. I have never tasted sweeter strawberries, watermelons, peaches, and tangerines.

Tokyo traffic is the world's worst. Trains, on the other hand, are amazingly punctual.

Kabuki is wonderful drama, but when you first hear the actors' piercing voices it sounds as if only one mouse had been thrown to all the cats in Hades.

Typhoons and earthquakes are never pleasant, even if you become accustomed to them.

A honey bucket by any other name wouldn't smell any sweeter.

Museum-like department stores are a shopper's mecca.

Japan's best product is her people. They are amazingly energetic, hard-working, and ambitious. Far from being stoic, they are extremely emotional and sentimental.

Random memories. . . like pieces of a picture puzzle. These are the thoughts that come to mind in retrospect.

What of first impressions?

Our family was introduced to Japan in March 1958. It had been 15 days since our MSTS ship left Seattle. Today most Air Force people fly over in less than 14 hours.

But regardless of how you get there, initial reactions are pretty much the same.

Few sights equal symbolic Mount Fuji. The 12,365-foot, snow-capped peak rises majestically over the cloud layer that usually surrounds it. Below a picture of endlessly beautiful panoramas unfolds. Everywhere the land is green and fertile, rushing down to meet the jagged, picturesque coastline.

As you approach the mainland, mile upon mile of handkerchief-shaped farms come into focus. Strangely tiled and thatched roof houses dot the countryside. By now the thought of cherry blossoms and geishas gains an even stronger hold on your imagination.

For most airmen and their families this is the first actual view of Japan. Nothing impresses you more at first than the spectacular scenery.

Yet it is only part of the picture, for Japan today is a land of intense change and even greater contrast. A

living paradox, it is a land where primitive past and ultra modern present exist side by side; where the twain of East and West have not only met, but mingled.

Although adopting many Western ways the Japanese, with an amazing ability, have retained much of the past. Centuries old temples and shrines, arts and crafts, festivals and ceremonies, castles and customs have been fully preserved.

For over a thousand years Japanese farmers have stood knee-deep in mud and water to plant their rice shoots with tender, back-bending care. Many of the *Noh* plays viewed by today's audiences are identical to those first performed in the 14th century. The simple interior style of most rural houses, noted for their *tatami*-matted floors and sliding *shoji* screens, hasn't changed appreciably for centuries.

Japan is a living museum, mellowed and dignified by the years.

Equally characteristic, however, is the dynamic drive evident in the cities. The pace is fast, almost hectic, as Japan continues one of the most amazing of all post-war recoveries.

This is the same nation which has become one of the world's leading industrial powers. Nothing symbolizes her vigor like the industrial rebirth which evolved after World War II. Iron and steel mills, ship building, heavy machinery, textile, construction, mining, and precision instrument industries are booming. She excels in the production of cameras, transistor radios, and opticals.

Tokyo, where one of every ten Japanese lives, is perhaps the most vivid example of the enormous change which has taken place since 1945. Reduced to rubble during the war, the city has sprung like a phoenix from the ashes. When U. S. occupation troops entered the city it had been totally incinerated. Oxcarts rumbling along the Ginza, the city's main artery, weren't an uncommon sight.

Now the world's largest metropolis, with a population of over 9.5 million, it is Japan's political and administrative hub. Vacant lots are a rarity as new multi-storied buildings continue to rise at an astonishing rate. Over 400 million dollars' worth of new construction went up last year. As many as 13,000 building projects were underway in the city during a single week.

Tokyo's new 1,092-foot television and tourist tower soars 108 feet higher than Paris' famed Eiffel Tower. In a city where fear of earthquakes has previously restricted the height of structures it reflects the intense desire to accept the challenge of the future.

But I digress. Let's return to the arrival.

Thanks to the Fifth Air Force's "sponsor" plan, we were met by an escort. Lt. Bob Waller proved to be our patron at Yokohama. With his guidance, we cleared customs and immigration in a matter of minutes. Having someone who knows his way around is especially valuable when you're juggling passports, luggage, and three young children.

Bob had arranged temporary quarters for us at the Green Park Housing Annex. Before our two-hour ride had ended he proved qualified for senior tour-guide status as he answered the dozens of questions we fired about this strange new land.

As we drove through the narrow streets of Yokohama we were amazed by the almost unbelievable congestion. Rosy-cheeked children waved at our staff car and yelled "hello." Boys on bicycles, balancing a dozen or more trays with bowls of soup-like *soba,* fascinated us.

Today most new arrivals land at Tachikawa or Yokota Air Bases, some 25 and 30 miles west of Tokyo and Yokohama.

It's not very far from Yokota to Yokohama. Yet the two are almost worlds apart.

Yokohama, like Tokyo, features the frenzied city pace. Walls of houses in both cities almost touch. They are unpainted, weatherbeaten, on streets dreary with similar unpainted, weatherbeaten houses. It isn't until after you have been there that you learn that Japan likes to hide its inner beauty from the street, so that when you enter the quiet home the effect of tranquility and art will be heightened. Japanese refer to this as their "inner look" or "look within" concept.

Life seems less hectic in the country.

Communities of thatched-roof houses line the road near Yokota and Tachikawa. Sliding panels with squares of white rice paper serve as both doors and windows. Even on cold winter days the screens are open during daylight hours, revealing the amazing simplicity of the rooms within. A small table is the only

furniture. Heavy *futon* (quilts) which serve as both bed and bedding are being aired on the porches. Many houses are surrounded by high shrubs for privacy. Here the unpainted wood and high-pitched roofs seem to blend perfectly with the surrounding countryside.

In this area, as in the small towns and villages, much less of the West has found its way into daily life than in the cities. A farmer may have abandoned his traditional gown-like clothing in favor of trousers and a shirt, and he may ride a bicycle to his fields, but his house, his food, and his relations with his neighbors will probably be modeled on those of his grandfather.

The farmer's house itself shows few signs of the tremendous changes of the past two decades. Television is the major exception. Thanks to hydroelectric power, electricity is available even in the smallest hamlets. TV aerials have become familiar signs even in remote mountain areas.

But whether you approach it from rural Yokota or congested Yokohama, your first contact with Green Park is likely to be surprising. Here, located under one giant roof, are 760 one-to-three bedroom apartments, a modern commissary, BX, library, snack bar, stylish officer and NCO clubs, dispensary, bank, theater, chapel, nursery, a host of specialty shops, and more than a million square feet of corridors. Besides being a temporary haven for newly arrived families it is the permanent home for more than 2,000 Americans throughout most of their stay in Japan.

Green Park for us, as it is for many families assigned to the Tokyo area, was home for two weeks. Others obtain temporary housing at base guest houses. Those going on to Itazuke or Misawa frequently spend their first night in Japan at the Yamato Air Station "Rotation Ranch." All unaccompanied personnel report to Yamato, which is only a mile from Tachikawa's MATS Terminal, for initial processing.

Almost immediately, however, the search for housing becomes the major order of business. For some the solution comes through actual purchase of small houses located on Grant Heights and other military installations. These two or three bedroom houses generally may be purchased at prices ranging from $1,500 to $4,000 when available.

Life in the "Paddies"

Most families, however, reside in private rentals while awaiting government quarters. We greeted living in the "rice paddies," as private rentals are commonly called, with somewhat mixed emotions. The cluster of small houses, with little or no yard space, isn't always attractive. The nearness of farms was indeed picturesque, but their distinct aromas during the planting seasons took a "little getting used to."

Our house, like most private rentals, was a simple western-style, one-story frame house with thin walls and no central heat. The area where we lived, near Fuchu Air Station, had some 15 houses occupied by fellow service families and was named Hitomi Heights. After our first few chilly nights there we affectionately renamed it "Gezundt Heights."

As is customary we had to purchase our own stove and kerosene heater, but were fortunate in being able to borrow a refrigerator from housing supply. Drinking water had to be hauled from the base. Lighting our outdoor kerosene hot water heater when we wanted a warm bath sometimes proved to be an adventure in itself.

For this our monthly rent was over $100. Added to this was another $25 per month for utilities, with kerosene for heating adding up to as much as $40 or more per month. Prices vary and may range anywhere from $70 to $150 per month with utilities as high at $55. Some spent up to $60 for heating.

Yet during warm months many of these private rentals are delightful. You become attached to them and some persons have declined government quarters when they became available.

Our first night in the "paddies" was especially eventful. Awakening suddenly we heard our windows rattling and our kerosene heater bouncing off the floor. Just when we were certain the roof was about to cave in, dead silence returned. We had experienced our first earthquake.

Before long we were taking the tremors in stride, for

Japan's jagged, picturesque coastline is dotted with fishing villages along its entire 16,600 mile length.

Photos these pages courtesy Embassy of Japan

more than 1,000 quakes a year are recorded throughout Japan. Fortunately most are so slight they can hardly be felt.

Early autumn typhoons, which bring relief from the long, hot, humid summer, prove even more "interesting." The worst we witnessed was 1959's typhoon Vera. More than 5,000 persons were killed in the Nagoya area; another 400,000 were left homeless.

U. S. forces worked around the clock following Vera. The crews of 25 U. S. helicopters flew 583 missions, during which they lifted 4,968 persons to safety and delivered 160,395 pounds of emergency food and supplies. Humanitarian actions like this and last year's airlift of iron lungs to polio-stricken Hokkaido have done much to strengthen U. S.-Japan relationships.

"Kamikaze" Now Drive Cabs

Apart from the weather, traffic, is undoubtedly the favorite conversation topic among U. S. personnel in Japan.

There's nothing that quite compares with the conglomeration of cars, buses, bicycles, three-wheelers, pedestrians, and the dreaded gravel trucks which clog Tokyo's roads. Traffic is unbelievable. On our first drive into the city we were caught in a maze-like jam that took almost an hour to travel five blocks.

We were amazed to see "kamikaze" taxi drivers, as they are somewhat less-than-affectionately known, actually drive onto sidewalks and pedestrian "safety" islands to ease their way ahead. No roller coaster holds the thrill of a Tokyo taxi ride.

Tokyo is always loaded with tourists. Dozens of bus loads of black-uniformed schoolboys and giggling girls are seen everywhere. Japanese are intensely fond of sightseeing and the Imperial Palace, occupying over 200 acres in the very heart of Tokyo, is a major attraction.

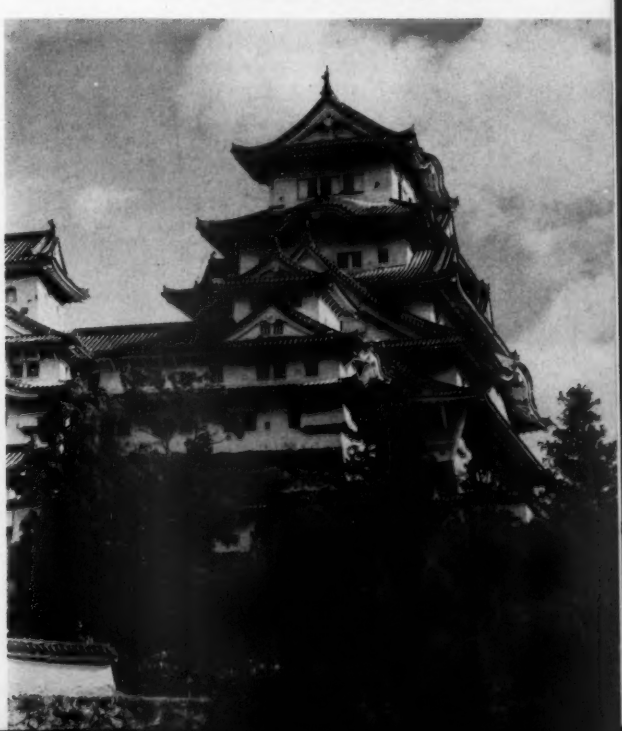
A Japanese couple in their summer "yukata" gowns view cricket cages at an evening fair booth. City dwellers feel the melodic chirping has a soothing effect.

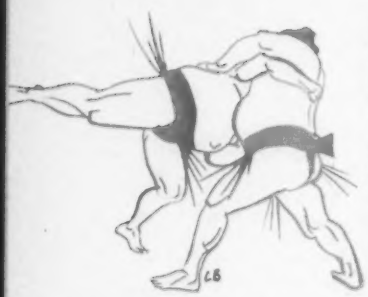
A wide moat filled with green water surrounds Edo Castle, as the present palace was first known. Beyond it, a great, tree-crowned, stone embankment weaves gently in and out. Ancient pines trail their graceful branches along the top, and when you pause to look carefully, you see the meticulous and loving care that has been lavished on each tree. White and black swans swimming in the pine-shadowed moat complete the picture of Japan's love for art and nature.

Within the palace walls lies the home of the longest uninterrupted dynasty of rulers in the world, extending unbroken for over 1,000 years since the advent of

Flowers play an important role in simple decor of a Japanese room. Arrangements symbolize heaven and man.

Ancient Himeji Castle, built in 1601, ranks among top tourist attractions.





Emperor Jimmu-Tenno. Even in Japan's history one finds contradiction. Some maintain Jimmu's reign began in 660 BC; others claim his rule began 800 years later. Only rarely before the 19th century, had Japan opened her gates to other civilizations. It is only in the last century that Western techniques appeared.

During these years the Emperor remained secluded while a series of military shogunates actually ruled the land. Soon after Commodore Perry sailed into Tokyo Bay in 1853 the Emperor Meiji ousted the ruling shogun and steered Japan into a course of modernization. Within 60 years she had defeated China and Russia and emerged as one of the great powers.

In the 1930s Japan fell under the influence of "patriotic societies" and aggressive militarists who sought to solve the nation's problems by external aggression. In 1937 they provoked open war with China. Pearl Harbor and war with the U. S. followed, ending with Japan's only defeat in modern history.

The transition from past to present is abrupt as you leave the palace walls.

Long regarded as the serviceman's favorite fun town, a mecca for GIs on R&R leave from Korea, Tokyo offers every imaginable form of entertainment — from coffee houses featuring Beethoven or rock'abilly, to grand 300-girl-cast musical reviews, "beesu-booru," bath houses, and more than 25,000 restaurants and cabarets. In case you think the "beesu-booru" doesn't compare with the U. S. brand, the last game we saw was a 2-1 Tokyo Giants victory over the San Francisco Giants. Willie Mays and his teammates were limited to two hits.

Suzzane Rust and her Japanese friend share hot dogs at Yokota Air Base's summer carnival. More than 100,000 neighboring Japanese visit the base yearly.

The narrow streets just off the Ginza provide the color of Tokyo. The cacophony created by the dozens of jingling *pachinko* pinball parlors blended with loudspeakers blaring intolerable jazz played through broken needles is almost unbelievable.

Yet off a street lined with garish advertisements you may pass into a restaurant and be ushered into a simple room where a low lacquer table is the only furniture. When we first dined at Okahan's we thought we had journeyed into the past. We came to learn that we were mistaken, for this simplicity was really an expression of contemporary preference. Most Japanese today, even the young rebels against tradition, feel happier eating a meal in such surroundings. So did we.

Air Bases Today

All USAF operational flying is now conducted at Yokota, Itazuke, and Misawa Air Bases, while MATS and 315th Air Division cargo and passenger operations are based at Tachikawa. Former USAF bases at such locations as Komaki, Atami, Kizarazu, Chitosi, Ashiya, and Johnson are now manned by Japan Air Self-Defense Force (JASDF). The network of radar stations which ring the Japan Seas and Pacific coasts have been under JASDF control since early 1960.

Most Air Force personnel assigned to Japan, and the vast majority of those authorized concurrent travel, are stationed in the Kanto Plain area— a multi-base complex within a 15-mile triangle extending 15 to 30 miles west of Tokyo.

Fuchu Air Station, where Fifth Air Force headquarters is located, serves as the nerve center for all combined USAF-JASDF defensive operations. Tachikawa and Yokota Air Bases, Yamato, Showa, and Johnson Air Stations are also located in the area.

Most of those who occupy government quarters live in one of several self-contained housing communities, similar in many ways to a typical American suburban community. Grant Heights, the largest, has a residential population of more than 7,500. Its Narimasu high and elementary schools boast over 2,000 students.

Our own quarters were at Washington Heights, less than three miles from the Ginza. Shibuya, a large shopping area featuring the modern, nine-story Toyoko department store, was within walking distance. Far East Network and the Pacific *Stars and Stripes* provided the radio and newspaper links found in the the typical U. S. home. Six Tokyo television channels offered enough variety to satisfy most video fans. Only Misawa AB boasts U. S. Armed Forces TV.

For our oldest son and daughter life at Washington Heights provided the unusual opportunity of attending a nearby private school in which children from 17 other nations were enrolled. For us it was the chance to meet and befriend a number of Japanese. While some persons have been critical of western-style communities abroad, we found that our Japanese friends were ex-

Heavy snowfalls are common throughout northern and western Japan. Airmen surveying this wintry scene were formerly stationed on an island in the Japan Sea.

tremely interested in them. They offered a vivid example of our American way of life.

Weekends provided unlimited touring opportunities. Within two or three hours we were able to drive to excellent seashore or mountain areas. Sightseeing and picnicking became a ritual.

In addition to the Tokyo area complex and major Pacific Air Forces (PacAF) bases at Itazuke and Misawa, there are a number of activities and detachments elsewhere. The largest and best known of these is isolated Wakkanai Air Station on the northernmost tip of Hokkaido, only 26 miles across Soya Strait from Soviet-held Sakhalin.

Bitterly cold winters are common on Hokkaido and northern Honshu. Snowfalls at Misawa AB have been so heavy that at times only persons on snowshoes or skis have been able to leave their quarters. Even Japan's highly efficient railroads have on occasion been forced to halt service in the area.

In Tokyo temperatures seldom drop more than a degree or two below freezing while high humidity and 90-degree temperatures make for rather hot, unpleasant summers. Weather at Itazuke, on the southernmost island of Kyushu, is similar to that of the Carolinas. Throughout most of Japan passage of the polar front in early summer and early fall generally triggers two-to-four-week rainy seasons.

Most travel guides stress that Japan's total land area is smaller than the state of California. Actually her size is deceptive. Her four major islands stretch over a 1,300-mile arc to the same latitudes as Maine and Florida. By European standards her geographic size takes on a new dimension, for Japan is larger than Germany and three times bigger than England. Only China, India, Soviet Russia, and the U. S. boast larger populations.

More important than the size of Japan's population is its personality.

The Japanese have been described as "amiable, courteous, peaceable and submissive." A confused stranger may wonder how such a universal description was ever founded.

One explanation offered is that the vertical relationships between family and friends are carefully prescribed. However, philosophers who were the "Emily Posts" of Japan's past rarely discussed how a man should behave towards strangers. If he steps on a stranger's foot there is no need to say "excuse me" or even acknowledge by a gesture that something has happened. Strangers simply do not exist for many Japanese.

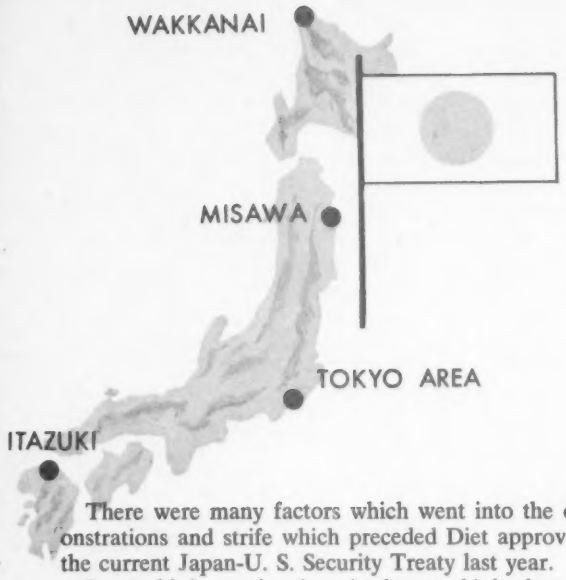
In the West we tend to be more concerned about strangers than about family or friends. It's all right to pick up a bone while dining at home but not in a restaurant. In Japan the practice is exactly the opposite. Before strangers it isn't uncommon for a person to sneeze, yawn, belch, or pick his teeth without bothering to cover his mouth. The Japanese gentleman thinks nothing of stripping to his underwear before strangers on a train, but if relaxing in the comfort of his home will hastily dress at word that an acquaintance is coming. The Japanese home is a model of neatness, but a public park is likely to covered with litter.

As an American, however, I have seldom had a Japanese fail to respond to a gesture of friendliness on my part. The language barrier isn't as important as you might think. Everywhere you will find someone who can speak English. Sign language, a smile, and an effort to use even a few Japanese words work additional wonders.

Perhaps one of the most confusing aspects of Japanese life we encountered was the religion. Almost every village is dominated by the massive tiled roof of its Buddhist temple, or its spot of greatest scenic beauty is likely to be occupied by a Shinto shrine. You ask how many Japanese are Shinto and how many are Buddhist. You're surprised to learn that almost every Japanese is both. You find it hard to see how anyone seriously convinced of either religion could accept the other, for the two are incompatible. The union was made possible only because man can divide his mind and accept contrary things at the same time. It is no understatement to say that religion is a complicated matter in Japan, perhaps more so than in most countries.

Political Situation Confusing

Even more confusing is the political situation. Today Japan is a constitutional monarchy with a government very similar to that of the democratic European monarchies. The Emperor's functions are largely symbolic, such as receiving ambassadors and convening the Diet (Japan's equivalent of Congress). The people, through their elected delegates to the Diet's two chambers, rule the land. Politics is the object of lively attention throughout the country. Demonstrations are rather frequent.



There were many factors which went into the demonstrations and strife which preceded Diet approval of the current Japan-U. S. Security Treaty last year.

It would be a drastic mistake to think that only Communists participated in the demonstrations. Undeniably many of them were led by professional Communists and many members of the mob were paid to be there. But many Japanese are bitterly anti-militarist. After the disastrous result of World War II they are deeply suspicious of everything and anything that could possibly get Japan into another war. For many students the thrill and excitement of participation was the stimulus. It was a chance to "blow off steam."

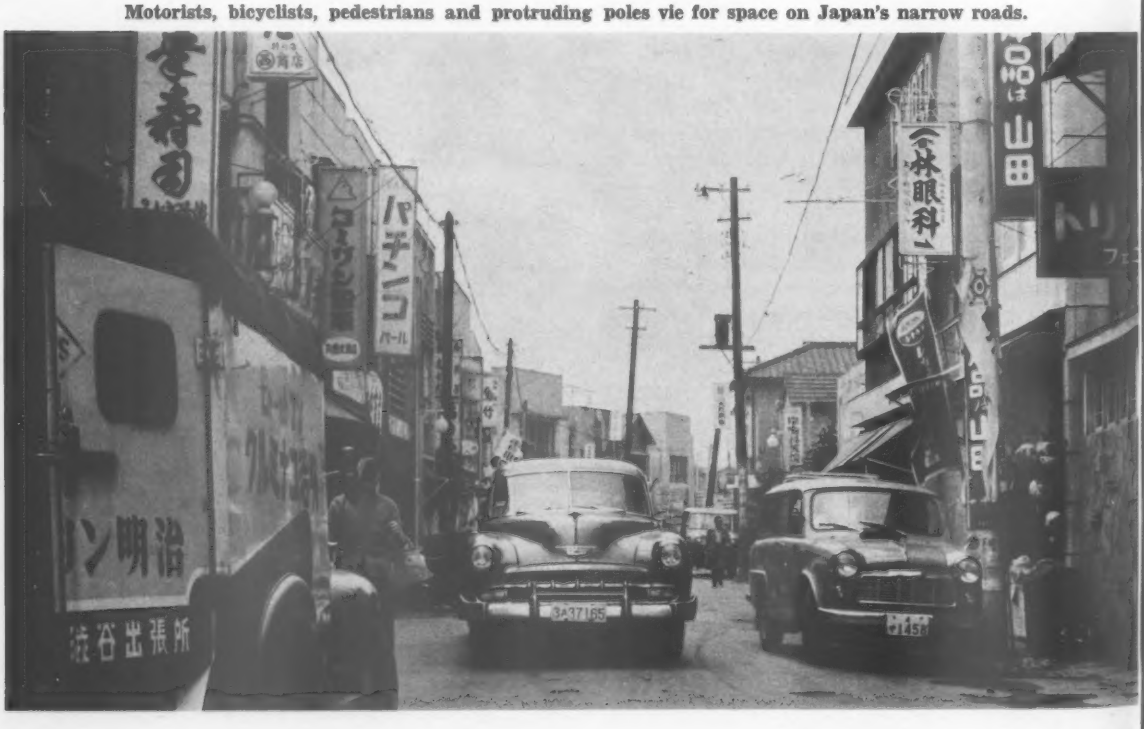
Fortunately, at no time were the demonstrations anti-American. Even more important is the continuing realization by Japan's government and a growing awareness by her citizens of the need for defense and reliance upon the West for assistance. The demonstrations did much to focus attention on the severity of the Communist threat.

Democracy is still strange to many Japanese. To many the acceptance of democracy's responsibilities as well as its liberties is still a problem. Yet as Edwin O. Reischauer, our Ambassador to Japan, has said, "too much emphasis is put on the weakness of democracy in Japan and not enough on its strength. The natural evolutionary trend in Japan is toward a more complete and perfect democracy. The growing democratic responses and independence of judgment of the younger generation also point clearly in this direction."

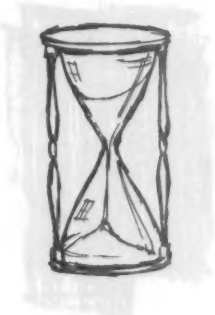
Yes, in politics, religion, customs, and many other ways Japan is confusing to the American. It is difficult to *really* describe the land and its people for, as has been said, there is no single key to an understanding of Japan. It is a combination lock.

What is Japan like? It's a land not of unique beauty but whose beauty is unique. Japan is a personal thing. You have to know her first hand to really appreciate her. She's a land of many faces. Happily, she has one that fits any mood.

Motorists, bicyclists, pedestrians and protruding poles vie for space on Japan's narrow roads.

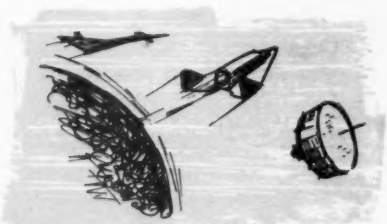


Secretary Zuckert On the Space Mission Of Aerospace Force



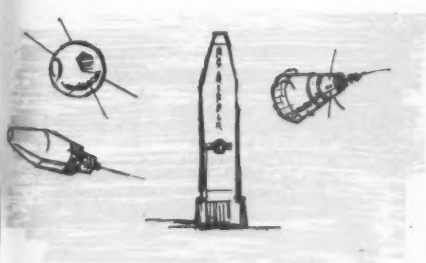
- Historians may see the line of demarcation between tomorrow and the day after as sharp and clear. It is not sharp and clear to us because we must prepare for both at the same time. The day after tomorrow is upon us. We must make decisions before today is ended, certainly while tomorrow is young, as to how and how fast we move into space.

- The Air Force of the day after tomorrow must be truly an aerospace force, unrestrained in its operations by Earth's gravity bond and fully clear of the atmospheric runway.



- We do not have a choice as to whether or not we invest in aerospace military forces. That decision is no longer subject to our shaping. It has been shaped by world events and by pressures beyond our control.

- For America to succeed—in preservation of the Nation in freedom, in furtherance of the welfare of men on Earth, in exploiting the knowledge of ourselves and our surroundings for man's good—our peaceful objectives on Earth must not be subject to interdiction from space.



- The Air Force has precise responsibilities within the military realm. All services have requirements utilizing space. The Department of Defense must approve them and it determines funding. The Air Force provides boosters and launch facilities—for example to Navy's *Transit* navigational system and the Army's *Advent* communications system. Incidentally, we also serve NASA in the same way for many projects, such as the first *Tiros* weather reconnaissance satellite.

BIGGEST LOAD EVER!

In a demonstration of limited-war capability for Tactical Air Command this F-105 *Thunderchief* carried seven tons of conventional bombs on a simulated mission. The 26 bombs, mounted on wing and belly racks, comprise the largest load ever flown by an Air Force fighter.

In another demonstration at the Air Proving Ground Center, Eglin AFB, Fla., four F-105s delivered two tons of napalm on target. Each *Thunderchief* carried 1,120 gallons of napalm in four tanks, two of 450-gallon capacity and two of 110 gallons.

The 1,400-mile-an-hour tactical fighter, now in service with Tactical Air Command in the U. S. and with U. S. Air Forces in Europe, can also carry nuclear weapons, rockets, and guided and unguided missiles. It is armed with a 20 mm. automatic cannon which fires at the rate of 6,000 shots per minute.